CLIMATE ACTION PLAN

TOWN OF SAN ANSELMO

APRIL 2011

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TABLE OF CONTENTS

1. Introduction

- 1.1 Purpose of the Climate Action Plan 1
- 1.2 Relationship to the General Plan 2
- 1.3 Climate Change Background 3
- 1.4 Climate Change Mitigation Activities in San Anselmo 5
- 1.5 Regulation of Climate Change – Federal, State & Regional Levels 6

2. San Anselmo's Greenhouse Gas Emissions

- 2.1 San Anselmo's Profile 11
- 2.2 2005 Greenhouse Gas Emissions Inventory 12
- 2.3 Forecast for 2020 Emissions 14
- 2.4 Greenhouse Gas Emissions Reduction Target 15

3. Actions to Reduce Greenhouse Gas Emissions

- 3.1 Summary of Greenhouse Gas Reduction Strategies 16
- 3.2 Natural Systems, Sequestration and Carbon Offsets 17
- 3.3 Land Use and Transportation 19
- 3.4 Green Building, Energy Efficiency and Renewable Energy 22
- 3.5 Green Purchasing 24
- 3.6 Waste Reduction, Recycling and Zero Waste 25
- 3.7 Water and Wastewater 27
- 3.8 State Actions 29
- 3.9 Adaptation 31

4. Plan Implementation 32

APPENDICES

- A. Data Sources, Assumptions and Calculations A-1
- B. Summary of Recommended Actions A-14

LIST OF FIGURES AND TABLES

FIGURES

Figure 1: The Greenhouse Effect 3
Figure 2: Inundation Effect of 16-Inch Sea Level Rise 4
Figure 3: Ecological Footprint Comparison 8
Figure 4: Marin County Emissions by Sector (2005) 9
Figure 5: Marin County Emissions 1990-2005 9
Figure 6: 2005 Community CO_2e Emissions 12
Figure 7: Emissions Reduction Target 15
Figure 8: Energy Used in California Homes (2005) 28

TABLES

Table 1: 2005 Government Operations Emissions by Sector 13
Table 2: Forecast for 2020 Emissions 14
Table 3: Mitigation Measures for Community Emissions 16
Table 4: Mitigation Measures for Government Operations Emissions 16
Table 5: Section 3.2 Community Mitigation Measures 17
Table 6: Section 3.2 Government Operations Mitigation Measures 17
Table 7: Section 3.3 Community Mitigation Measures 19
Table 8: Section 3.3 Government Operations Mitigation Measures 19
Table 9: Section 3.4 Community Mitigation Measures 22
Table 10: Section 3.4 Government Operations Mitigation Measures 23
Table 11: Section 3.5 Community Mitigation Measure 24
Table 12: Section 3.6 Community Mitigation Measures 25
Table 13: Section 3.6 Government Operations Mitigation Measures 25
Table 14: Section 3.7 Community Mitigation Measure 27
Table 15: Section 3.8 Community Mitigation Measures 29
Table 16: Section 3.8 Government Operations Mitigation Measures 29

1. INTRODUCTION

1.1 Purpose of the Climate Action Plan

The Town of San Anselmo understands that climate change has the potential to significantly affect San Anselmo's residents and businesses, as well as other communities around the world. The Town also recognizes that local governments play a strong role in reducing greenhouse gas emissions and mitigating the potential impacts of climate change.

The purpose of this Climate Action Plan is to compile existing and potential strategies (i.e., actions, projects, and programs) that the Town's government operations and the community can take to address climate change. It provides a brief background on what climate change is and its potential impacts, but focuses on the efforts San Anselmo can take to reduce its greenhouse gas emissions and mitigate, to the extent feasible at the local level, the potential impacts of climate change.

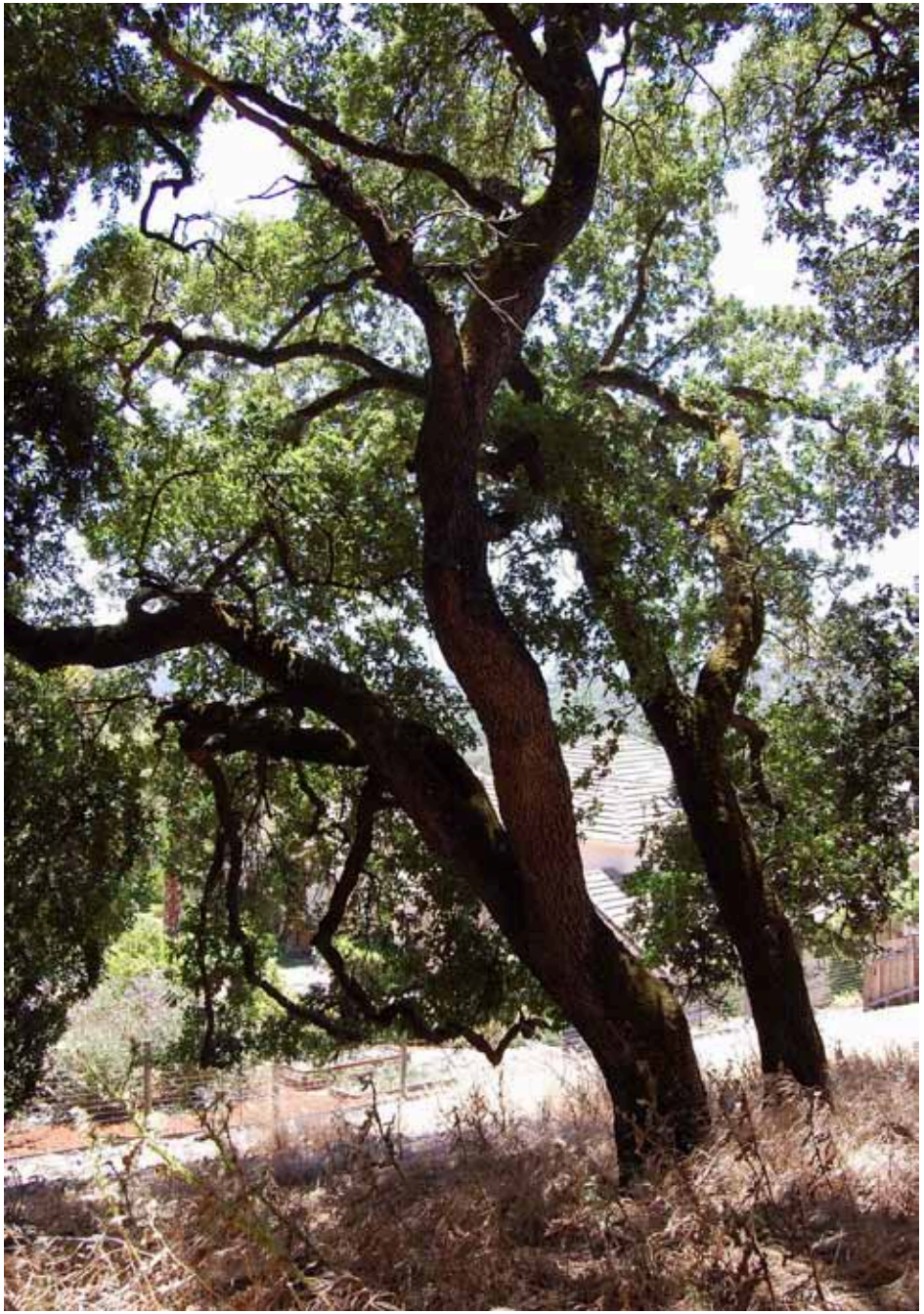
Through actions outlined in this plan, such as increasing energy efficiency in buildings, encouraging less dependence on the automobile, and using clean, renewable energy sources, the community can experience lower energy bills, improved air quality, reduced emissions, and an enhanced quality of life. The Town's preparation of a 2005 Greenhouse Gas Emissions Inventory and this Climate Action Plan are the beginning of an ongoing planning process that includes assessing, planning, mitigating and adapting to climate change.

Specifically, this Plan does the following:

- Summarizes the various regulations at the federal, state, and regional levels.
- Incorporates the Town's 2005 Greenhouse Gas Emission Inventory, which identified sources of greenhouse gas emissions generated by both the community and the Town's government operations.
- Estimates how these emissions may change over time and establishes a target to reduce greenhouse gas emissions to 15% below 2005 levels by 2020.
- Provides natural system, energy use, transportation, land use, green purchasing, waste and water use strategies necessary to minimize San Anselmo's impacts on climate change and meet the established greenhouse gas emissions reduction target.

1.2 Relationship to the General Plan

Though both the General Plan and the Climate Action Plan are intended as long-range plans, the Climate Action Plan may be updated on a more regular basis to add and amend strategies as new information, policy guidance, and regulations regarding climate change evolve and new technologies to address it are developed. It is intended that a future update of the San Anselmo General Plan 1989 will integrate and reference this plan, instead of including the plan in the General Plan itself.



1.3 Climate Change Background

A balance of naturally occurring gases dispersed in the atmosphere determines the Earth's climate by trapping infrared radiation (heat), a phenomenon known as the greenhouse effect. Significant evidence suggests that human activities are increasing the concentration of these gases (known as "greenhouse gases" or GHG) in the atmosphere, causing a rise in global average surface temperature and consequent global climate change. The greenhouse gases include carbon dioxide, methane, nitrous oxide, halocarbons, ozone, and water vapor. Each one has a different degree of impact on climate change. To facilitate comparison across different emission sources with mixed and varied compositions of several GHG, the term "carbon dioxide equivalent" or CO_2e is used. One metric ton of CO_2e may consist of any combination of GHG, and has the equivalent Global Warming Potential (GWP) as one metric ton of carbon dioxide (CO_2). According to the U.S. Environmental Protection Agency's April 2009, "Inventory of U.S. Greenhouse Gas Emissions," the majority of GHG emissions comes from fossil fuel combustion, which in turn is used for electricity, transportation, industry, and heating, etc.

Collectively, these gases intensify the natural greenhouse effect, causing global average surface temperatures to rise, which affects local and global climate patterns. These changes in climate are forecasted to manifest themselves in a number of ways that might impact San Anselmo as well as other changes to local and regional weather patterns and species migration.

According to a 2006 Summary Report from the California Climate Change Center, global warming could significantly impact California water and forest resources. The Center's 2006 Summary Report noted the following findings and potential risks to California[1]:

- Precipitation is the most important hydrologic variable and most difficult to forecast.
- Warming raises the elevation of snow levels with reduced spring snowmelt and more winter runoff.
- Less snowmelt runoff means lower early summer storage at major foothill reservoirs with less hydroelectric power production.
- Higher temperatures and reduced snowmelt compounds the problem of providing suitable cold-water habitat for salmon species.
- Rising sea levels would adversely affect many coastal marshes and wildlife reserves.
- Higher temperatures increase the demand for water by plants.
- Climate change in California will result in a higher frequency of large damaging fires.
- Regional climates that are hotter and drier will result in increased pest and insect epidemics within California's forests.

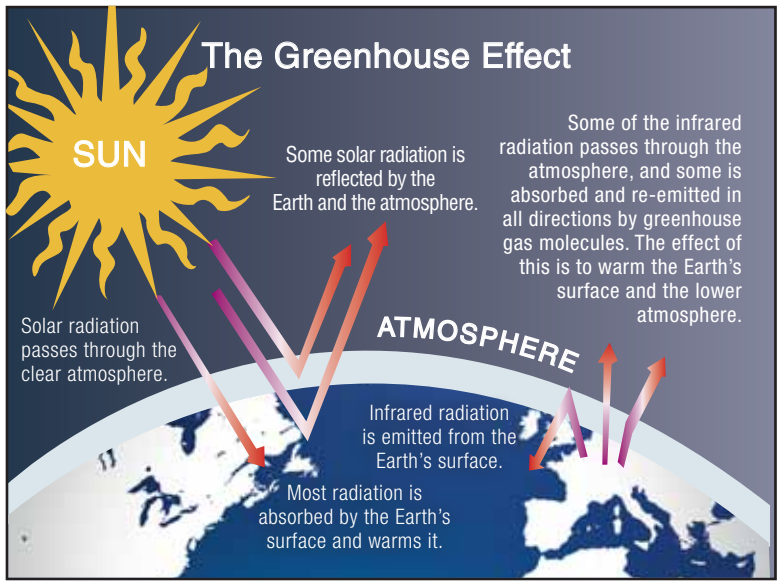

The Greenhouse Effect
SUN
Some solar radiation is reflected by the Earth and the atmosphere.
Some of the infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the Earth's surface and the lower atmosphere.
Solar radiation passes through the clear atmosphere.
ATMOSPHERE
Infrared radiation is emitted from the Earth's surface.
Most radiation is absorbed by the Earth's surface and warms it.

Figure 1: The Greenhouse Effect

1 A Summary Report from: California Climate Change Center. Our Changing Climate: AssessinA Summary Report from: California Climate Change Center. Our Changing Climate: Assessing the Risks to California. Document No. CEC-500-2006-077, July 2006. http://www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF, accessed 2/14/11.

Sea Level Rise

Because of scientific uncertainties, it is difficult to predict with a high degree of accuracy the sea level rise that will impact Marin County residents. The San Francisco Bay Conservation and Development Commission's (BCDC) most recent assessment assumes a 1.8° to 5.4° F (1° to 3° C) rise in global temperature over the next century and a corresponding sea level rise in San Francisco Bay of 16 inches by mid-century and 55 inches by 2100.[2] Sea level rise of this magnitude would have dramatic impacts on residences, businesses, schools, and public infrastructure located near the shoreline. Inundation maps created by BCDC (see Figure 2) integrate GIS data from the USGS and sea level rise projections to assess the vulnerability of Bay Area communities to different sea level rise scenarios. A 16-inch rise in sea level would result in the flooding of 180,000 acres of shoreline, which is roughly equivalent to today's 100-year floodplain. A 55-inch rise in sea level would flood over 213,000 acres of shoreline, putting billions of dollars of private and public development at risk. Changes in climate and sea level could cause an increase in storm activity, storm surges, and even greater flooding.

Figure 2: Inundation Effect of 16-Inch Sea Level Rise-San Francisco Bay at Richmond San Rafael Bridge

The areas in blue identify the land area that is subject to inundation from a 16-inch rise in sea level.

SOURCE:
http://www.bcdc.ca.gov/planning/climate_change/maps/16/cbay_north.pdf; Inundation data from Knowles, 2008. Aerial imagery is NAIP 2005 data. Accessed 7/2/10.
DISCLAIMER: Inundation data does not account for existing shoreline protection or wave activity. These maps are for informational purposes only.

2 San Francisco Bay Conservation and Development Commission DrSan Francisco Bay Conservation and Development Commission Draft Staff Report, "Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline," April 7, 2009, http://www.bcdc.ca.gov/proposed_bay_plan/bp_1-08_cc_draft.pdf, accessed 3/30/10.

1.4 Climate Change Mitigation Activities in San Anselmo

The Town has taken a number of initiatives in recent years to reduce greenhouse gas emissions. These include the following early actions:

- Purchased two hybrid vehicles – a Toyota Highlander Hybrid for use by the Police Chief, and a Ford Escape Hybrid for the community services patrol.
- The Police Department has purchased two fuel-efficient patrol vehicles. The new Dodge Chargers use only four cylinders while idling, but can switch to eight cylinders in the "pursuit ready" mode. The Police Department plans to phase these fuel-efficient models into the police fleet as vehicles are replaced.
- Installed solar panels on the downtown fire station.
- Remodeled the downtown fire station with energy efficiency upgrades such as double pane windows, new insulation, etc.
- Installed energy efficient lighting in the Police Department, Council Chambers, and downtown fire station.
- Participating in Safe Routes to Schools and Safe Paths to Schools grant programs to construct sidewalks, bike paths and curb ramps near Brookside School, Wade Thomas School and St. Anselm's School to encourage walking and biking to school.
- Replaced old boiler at the Isabel Cook Community Center with three energy-efficient boilers.
- Continued implementation of the annual curb ramp replacement program to facilitate accessibility and walkability.
- Working with funding through the Non-Motorized Transportation Pilot Program, which is intended to increase the mode share of cycling and walking for everyday transportation, installed pedestrian improvements and overhead warning indicators at unsignalized intersections at Saunders and Madrone Avenues and Sir Francis Drake Boulevard.
- Installed bike racks, loop detectors, sharrows, and route signage and pavement stenciling to encourage bicycle use throughout town.
- Purchased numerous pieces of Energy Star-rated computer equipment to phase out older, less energy-efficient equipment.
- Adopted a Green Building Ordinance (Ord. No. 1076) in 2010 with building efficiency standards above the State green building and energy codes.
- Adopted the Town of San Anselmo Bicycle and Pedestrian Master Plan Update in 2008 which outlines future bicycle and pedestrian improvement programs and projects throughout the Town to promote increased bicycle and pedestrian travel and decrease the use of vehicles.
- Joined the Marin Energy Authority and chose Marin Clean Energy electricity with a minimum 25% (light green) renewable energy source content for all Town operations.
- Obtained a grant to replace 170 street lights with high efficiency induction or LED lighting.

1.5 Regulation of Climate Change – Federal, State and Regional Levels

Federal Climate Policy

Currently, there is no federal legislation mandating comprehensive greenhouse gas emission reporting or reduction in the United States. Efforts, however, are underway in Congress to develop and enact climate and energy legislation. The U.S. House of Representatives passed a GHG emissions cap-and-trade bill, Waxman-Markey, in June 2009. The U.S. Senate considered, but failed to pass, various cap-and-trade bills in 2009 and 2010. These bills utilized a market-based approach to controlling emissions by allocating permits to companies that allow them to emit a certain volume of greenhouse gasses. Companies that need to expand their operations may buy permits from other companies which have been able to reduce their emissions. In this way, buyers are penalized for discharging more emissions, sellers are rewarded for reducing emissions, and overall emissions are capped at a predetermined amount.

Absent congressional action, the U.S. Environmental Protection Agency (EPA) has used its rulemaking authority under the Clean Air Act to begin to regulate greenhouse gas emissions. In 2009, the EPA made an "endangerment finding" that GHGs threaten the public health and welfare of the American people.[3] This finding provided the statutory prerequisite for EPA regulation of GHG emissions from motor vehicles and has led to a number of GHG regulations for stationary sources. In May 2010, the EPA issued a "tailoring" rule that enables the agency to control GHG emissions from the nation's largest GHG sources, including power plants, refineries, cement production facilities, industrial manufacturers and solid waste landfills, when these facilities are newly constructed or substantially modified. The EPA reports that its GHG permitting requirements will address 70% of the national GHG emissions from stationary sources.[4] These rules went into effect in January 2011.

In April of 2010, the Environmental Protection Agency and Department of Transportation finalized new fuel efficiency standards for model year 2012 through 2016 cars and light trucks. These vehicles will have to meet a combined average emissions level of 250 grams of carbon dioxide per mile, or the equivalent to 35.5 miles per gallon (MPG), up from the current standard of 27.5 MPG. The EPA and the Department of Transportation are currently developing first-ever regulations for medium and heavy-duty vehicles.[5]

3 Final Rule, EPA, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under the Clean Air Act, 74 Fed. Reg. 66495 (Dec. 7, 2009).

4 Final Rule: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule Fact Sheet, EPA, http://www.epa.gov/NSR/documents/20100413fs.pdf.

5 U.S. Environmental Protection Agency, http://www.epa.gov/oms/climate/regulations.htm#1-1, accessed 12/9/10.

State Climate Policy

California produces roughly 1.4 percent of the world's and 6.2 percent of the total U.S. greenhouse gases (GHG). The State of California has taken the lead in setting specific targets for reducing greenhouse gas emissions from the burning of fossil fuels in both power plants and vehicles through the following legislation:

Senate Bill 1078 Sher, 2002. Established a Renewable Portfolio Standard requiring electricity providers to increase purchases of renewable energy resources by 1% per year until they have attained a portfolio of 20% renewable resources.

Executive Order S-21-09. In September 2009, California Governor Arnold Schwarzenegger signed an executive order directing the State's Air Resources Board to adopt regulations increasing California's Renewable Portfolio Standard (RPS) to 33 percent by 2020. The RPS will apply to investor-owned utilities, publicly-owned utilities, direct access providers, and community choice aggregators, including Marin Energy Authority.

Assembly Bill 1493 Pavley, 2002. Requires the California Air Resources Board (CARB) to develop and adopt regulations that achieve the maximum feasible reduction of greenhouse gasses from vehicles primarily used for non-commercial transportation by January 2005. In 2009, CARB adopted final regulations that are expected to reduce GHG emissions from California passenger vehicles by about 22 percent in 2012 and about 30 percent in 2016.

Senate Bill 1771 Sher, 2000. Requires the California Energy Commission (CEC) to prepare an inventory of the State's greenhouse gas emissions, to study data on global climate change, and to provide government agencies and businesses with information on the costs and methods for reducing greenhouse gases. Also establishes the California Climate Action Registry to serve as a certifying agency for companies and local governments to quantify and register their greenhouse gas emissions for possible future trading systems.

Assembly Bill 32 Nuñez & Pavley, 2006. Also known as The Global Warming Solutions Act of 2006, institutes a mandatory limit on greenhouse gas pollution and requires a reduction in emissions in California to 1990 levels by the year 2020. The bill also directs the California Air Resources Board (CARB) to establish a mandatory reporting system to track and monitor emission levels and requires CARB to develop various compliance options and enforcement mechanisms.

Senate Bill 375 Steinberg, 2008. Assigns a greenhouse gas reduction target for car and light truck emissions for each region in the State represented by a metropolitan planning organization (MPO) that is to be addressed with a Sustainable Communities Strategy (SCS). Also touches on planning for transportation, housing and the environment and requires Alternative Planning Strategy documents where a SCS will not achieve the GHG reduction targets.

The most significant of these initiatives are AB 32 and SB 375; the first requires California to reduce its GHG to 1990 levels by 2020, and the second begins to tie GHG reductions to land use. In 2007, the California Air Resources Board (CARB) conducted an emissions inventory for the state to identify emissions levels in 1990 that figure 427 million metric tons of carbon dioxide equivalent. The inventory revealed that transportation was the largest single sector (35% of the state's total 1990 emissions), followed by industrial emissions (24%), imported electricity (14%), in-state electricity generation (11%), residential use (7%), agriculture (5%), and commercial use (3%).[6]

Preliminary estimates indicate that California's 2020 emission projections could be 600 million tons of CO_2e if no actions are taken to reduce GHG. This means that California must prevent 173 million tons of CO_2e from being emitted by 2020 in order to meet the 1990 levels as required by AB 32.

CARB is responsible for monitoring and reducing GHG emissions set forth in AB 32, and is, therefore, coordinating statewide efforts. In December 2008, CARB adopted a Scoping Plan that outlines the actions required for California to reach its 2020 emission target. The actions include a broad set of clean energy, clean transportation, and efficiency standards.

6 http://www.arb.ca.gov/newsrel/nr120607.htm, accessed 1/1/10.

In 2009, CARB identified and implemented nine discrete early action measures including regulations affecting landfills, motor vehicle fuels, refrigerants in cars, tire pressure, port operations and consumer products. Additional reduction measures to meet the 2020 target will be adopted in 2011.

Key strategies identified in the Scoping Plan that are best developed and supported by local governments in achieving the climate protection and emission reduction goals include:

- Transportation and community design
- Local and regional emission targets
- Recycling and waste reduction
- Clean energy
- Green buildings
- Water

The CARB Climate Change Scoping Plan "encourages local governments to adopt a reduction goal for municipal operations emissions and move toward establishing similar goals for community emissions that parallel the State commitment to reduce greenhouse gas emissions by approximately 15 percent from current levels by 2020."[7] However, CARB does not yet require cities to adopt climate action plans as part of AB32 implementation efforts.

Marin County Climate Policy

Underpinning sustainability and climate change efforts in Marin County is the recognition that Marin residents consume resources at a far greater rate than most industrialized nations, and that the worldwide use of resources is exceeding the earth's capacity to renew them. One way to measure the use of natural resources against the planet's actual biocapacity and ability to renew those resources is the "ecological footprint." It can be calculated for individuals, regions, countries, or the entire earth and is expressed as the number of global acres (acres with world average biological productivity) that it takes to support one person. As Figure 3 shows, the average American uses 24 global acres per capita, while the average Marin resident requires 27 global acres. Other western democracies, such as France, Germany, and Italy, have footprints of 13, 12, and 9.5 global acres per person, respectively. According to the Global Footprint network, if every person lived the lifestyle of one American, we would need five planets to sustain us.

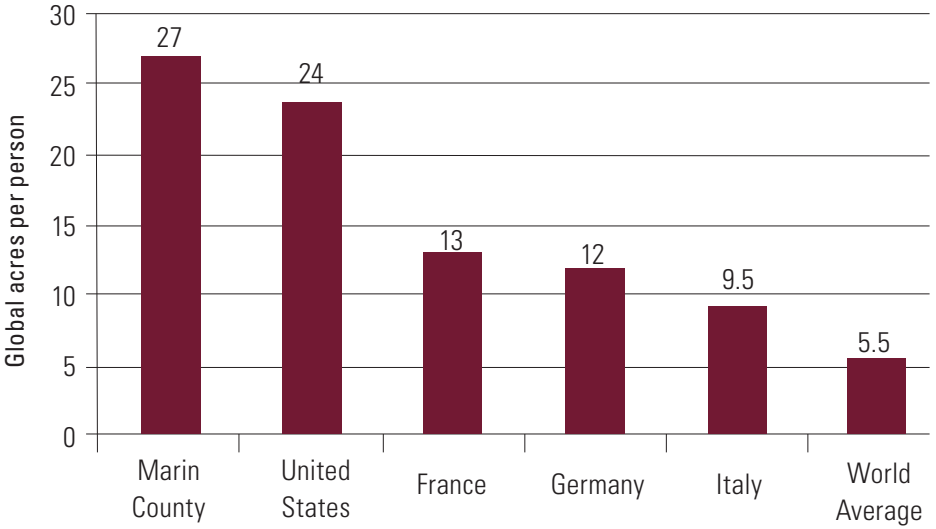


Figure 3: Ecological Footprint Comparison

Source: Redefining Progress, Sustainable Sonoma County, Worldwide Fund for Nature, as quoted in the Marin Countywide Plan, adopted November 6, 2007.

7 California Air Resources Board, "Climate Change Scoping Plan," December 2008, p. 27, http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf, accessed 3/31/10.

In 2006, Marin County developed a strategic plan to reduce annual GHG emissions to 15% below 1990 levels by 2020. In 2007, the County re-inventoried their greenhouse gas emissions. Figures 4 and 5 show the distribution of County-wide GHG emissions by sector in 2005 and emission trends between 1990 and 2005. Total countywide greenhouse gas emissions increased by approximately 6% between 1990 and 2005, from 3,005,674 to 3,188,522 tons CO_2e.[8] This 6% rate of increase can be used as a proxy to estimate the increase in San Anselmo's emissions between 1990 and 2005, since actual data is unavailable.

While the County has taken important steps to reduce greenhouse gas emissions, a large portion of Marin County is operated and governed by the eleven local jurisdictions and numerous special districts. It is therefore important that the municipalities, such as San Anselmo, participate in developing local emission reduction measures and policies.

Figure 4: Marin County Emissions by Sector (2005)

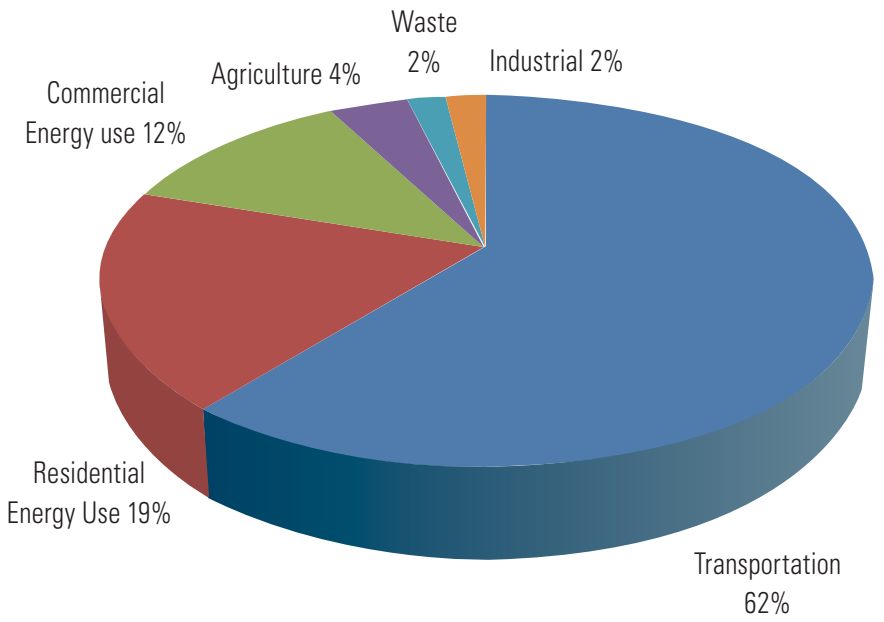
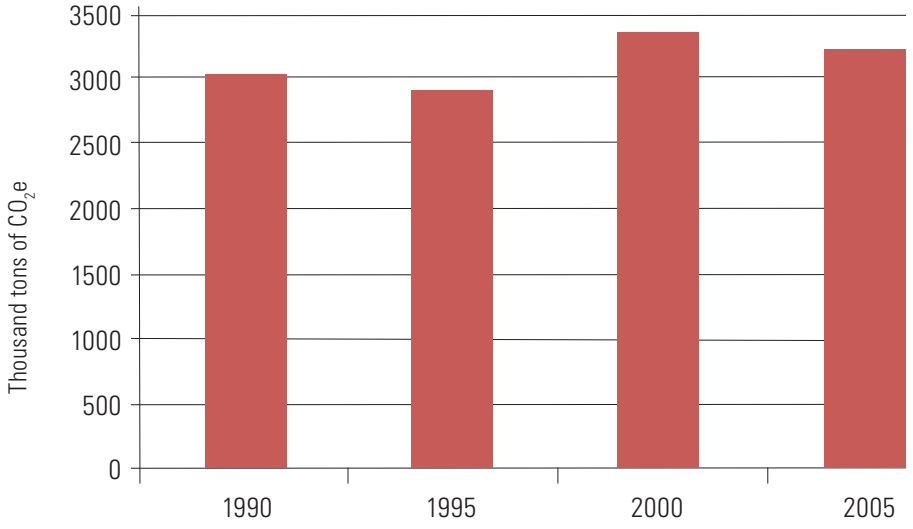


Figure 5: Marin County Emissions 1990-2005



8 Marin County Re-Inventory of Greenhouse Gas Emissions," Marin County Community Development Agency, September 2007.

Coordinated Multi-Jurisdictional Approach: Marin Climate and Energy Partnership

Created in 2007, the mission of the Marin Climate & Energy Partnership (MCEP) is to reduce greenhouse gas emission levels to the targets of Marin County and local municipalities, consistent with the standards set by AB32. All eleven Marin cities and towns, the Marin County Community Development Agency, the Transportation Authority of Marin, and the Marin Municipal Water District are members. The Marin General Services Authority is the joint powers authority with fiscal responsibility for the Partnership.

One of MCEP's first projects was to work with ICLEI – Local Governments for Sustainability, a nonprofit organization, to develop greenhouse gas emissions inventories for the partner jurisdictions. With Bay Area Air Quality Management District grant funding, MCEP also worked on programs related to reducing energy use in municipal buildings, establishing a green purchasing collaborative, reducing energy use in residential and commercial buildings, reducing emissions from private and municipal vehicles, and reducing energy use and emissions from waste.

In 2009, MCEP developed a green building strategic plan and green building policies which resulted in the Marin Green BERST model ordinance. The Marin Community Foundation provided funding for this effort, as well as funds to develop climate action plans for six partner jurisdictions. Partner members have agreed to use their adopted climate action plans to identify mutual measures to reduce community-wide greenhouse gas emissions and develop policies and programs to support priority measures. The Town has worked closely with the Marin Climate and Energy Partnership to complete this climate action plan, and to implement a coordinated approach to local and regional emissions reduction targets and climate action planning goals.

2. SAN ANSELMO'S GREENHOUSE GAS EMISSIONS

2.1 San Anselmo's Profile

Located in Marin County approximately thirteen miles north of the Golden Gate Bridge in the center of beautiful Ross Valley, San Anselmo is a small town with a land area of 2.75 square miles and an estimated current population of 12,336. Primarily a residential community, San Anselmo has a vibrant and charming downtown with many restaurants and shops. The Town has public and private schools for grades K-12, a post office, a library, police and fire stations, and a Town Hall. With abundant parks and open space, and both public and private recreational facilities, there are many recreational opportunities within town. Although some residents work in San Anselmo, a majority commute to jobs in San Francisco, Marin County and other locations.

9 2010 U.S. Census, Table P1

2.2 2005 Greenhouse Gas Emissions Inventory

The first step toward reducing greenhouse gas emissions is to identify sources of emissions and establish baseline levels. This information can then inform the selection of a reduction target and possible reduction measures to be included in the climate action plan. In 2009, the Town prepared a report that inventories greenhouse gas emissions from the San Anselmo community and, as a subset of that analysis, local government operations. The report provides a detailed understanding of where the highest emissions are coming from, and, therefore, where the greatest opportunities for emissions reductions lie. The inventory also establishes a baseline emission inventory against which to measure future progress.

The inventory analyzes four primary sectors of community emissions: residential, commercial, transportation, and waste. Residential and commercial emissions come primarily from the on-site combustion of natural gas and the off-site generation of electricity for heating, cooling, lighting, cooking, and the operation of appliances and electrical devices. Transportation emissions result from the combustion of diesel and gasoline on roadways within the Town of San Anselmo. Waste emissions come from the decomposition of waste generated by residents and businesses in landfills outside the Town limits.

Government operations emissions are categorized according to six primary sectors: buildings; streetlights and park lighting; water delivery facilities such as irrigation systems; vehicle fleet, including police and public works vehicles; government-generated solid waste, including public trash cans and street sweepings; and employee commute.

The inventory utilizes 2005 as the baseline year, as this year is increasingly becoming the standard for such inventories. Due to lack of city-specific data, the 1990 baseline year utilized by the State of California is usually too difficult for most local governments to meet and would not produce the most accurate inventory. According to the Association of Bay Area Governments (ABAG) Projections 2009, San Anselmo's population was 12,500 in 2005, and there were approximately 5,290 households. Included as an indicator of commercial activity, the number of jobs within San Anselmo in 2005 was 4,990.

Community Inventory Results

In 2005, the San Anselmo community emitted approximately 69,706 metric tons of CO_2e. As shown in Figure 6 below, the Transportation sector was the largest source of emissions, generating approximately 36,292 metric tons of CO_2e, or 52.1% of total 2005 emissions. Transportation emissions are the result of diesel and gasoline combustion in vehicles traveling on local roads. Electricity and natural gas use in the Residential sector emitted 23,850 metric tons CO_2e, representing 34.2% of total emissions. The Commercial/Industrial sector, the third greatest source of 2005 emissions, generated 7,396 metric tons CO_2e, or 10.6% of the total. The remaining 3.1% (2,168 metric tons) are the estimated future methane emissions that will result from the decomposition of waste that was generated by the San Anselmo community during 2005.

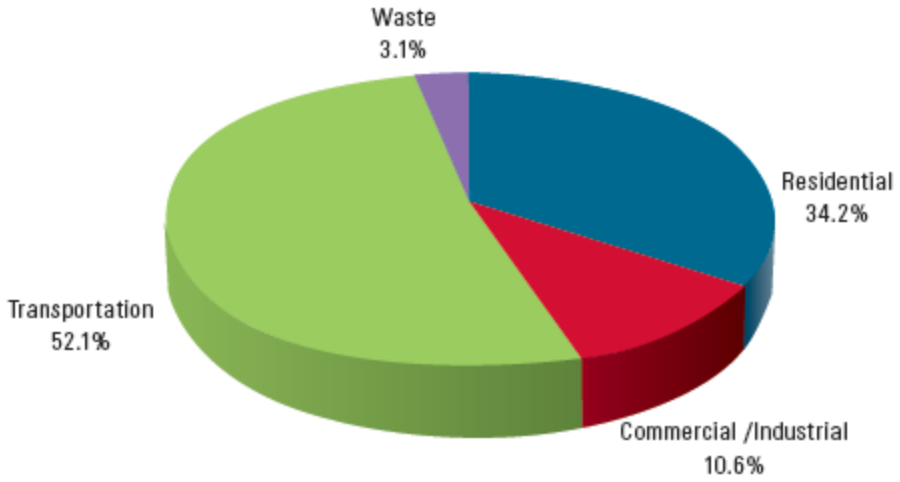


Figure 6: 2005 Community CO_2e Emissions

Government Operations Inventory Results

In 2005, San Anselmo government operations emitted approximately 633 metric tons of CO_2e.[10] As shown in Table 1, the Employee Commute sector was the largest emitter (30.9%) in 2005. Emissions from the Buildings sector produced the second highest quantity of emissions, resulting in 26.0% of total CO_2e; and the Vehicle Fleet sector produced 23.3% of total emissions. The remainder of emissions came from the Waste sector (6.6%) and the Lighting sector (12.7%), with nominal emissions from the Water sector. Emissions from government operations produced approximately 0.9% of total community emissions.

Table 1: 2005 Government Operations Emissions by Sector

Sector	Greenhouse Gas Emissions (metric tons CO_2e)	Greenhouse Gas Emissions (% CO_2e)	Energy Equivalent (million Btu)	Cost* ($)	% of Total Cost
Buildings	165	26.0%	1,254	$42,032	45.4%
Vehicle Fleet	147	23.3%	1,766	$35,589	38.5%
Lighting	81	12.7%	445	$14,487	15.7%
Water	3	0.5%	1	$379	0.4%
Waste	42	6.6%	0	n/a	0.0%
Employee Commute	195	30.9%	1,418	n/a	0.0%
TOTAL	633	100.0%	4,883	$92,486	100.0%

* Energy cost for electricity, natural gas, gasoline and diesel in 2005.

10 This number includes all Scope 1 emissions from the on-site combustion of fuels in facilities and vehicles, Scope 2 emissions from the purchase of electricity, and Scope 3 emissions from waste generated by local government operations and emissions associated with employee commute patterns.

2.3 Forecast for 2020 Emissions

To illustrate the potential emissions growth based on projected trends in energy use, driving habits, job growth, and population growth from the baseline year going forward, this plan includes an emissions forecast for the year 2020. Under a business-as-usual scenario, San Anselmo's emissions will grow by approximately 6.6% by the year 2020, from 69,706 to 74,295 metric tons CO_2e. Table 2 shows the result of the forecast by sector. A variety of different reports and projections were used to create the emissions forecast, as profiled below.

For the residential and waste sectors, population projections for San Anselmo, as released by the Association of Bay Area Governments (ABAG) in 2009, were used to estimate average annual compound growth in energy demand. ABAG estimates the San Anselmo population will stabilize at 12,500 until 2035, when it will rise to 12,600.

Analysis contained within *California Energy Demand 2008-2018: Staff Revised Forecast*[11], a report by the California Energy Commission (CEC), shows that commercial floor space and the number of jobs have closely tracked the growth in energy use in the Commercial Sector. ABAG projects job growth will increase from 4,990 jobs in 2005 to 5,060 in 2020. Using this growth projection of 70 jobs, it was calculated that the average annual growth in energy use in the commercial sector between 2005 and 2020 would be 1.4%.

For the transportation sector, the Metropolitan Transportation Commission (MTC) projects that county-wide vehicle miles traveled in Marin County will increase at a rate of 0.78% a year between 2006 and 2020, or approximately 12.4% between 2005 and 2020.[12]

As no significant expansion of government services is expected over the next ten years, government operations emissions are projected to remain consistent with 2005 levels under a business as usual scenario.

Table 2: Forecast for 2020 Emissions

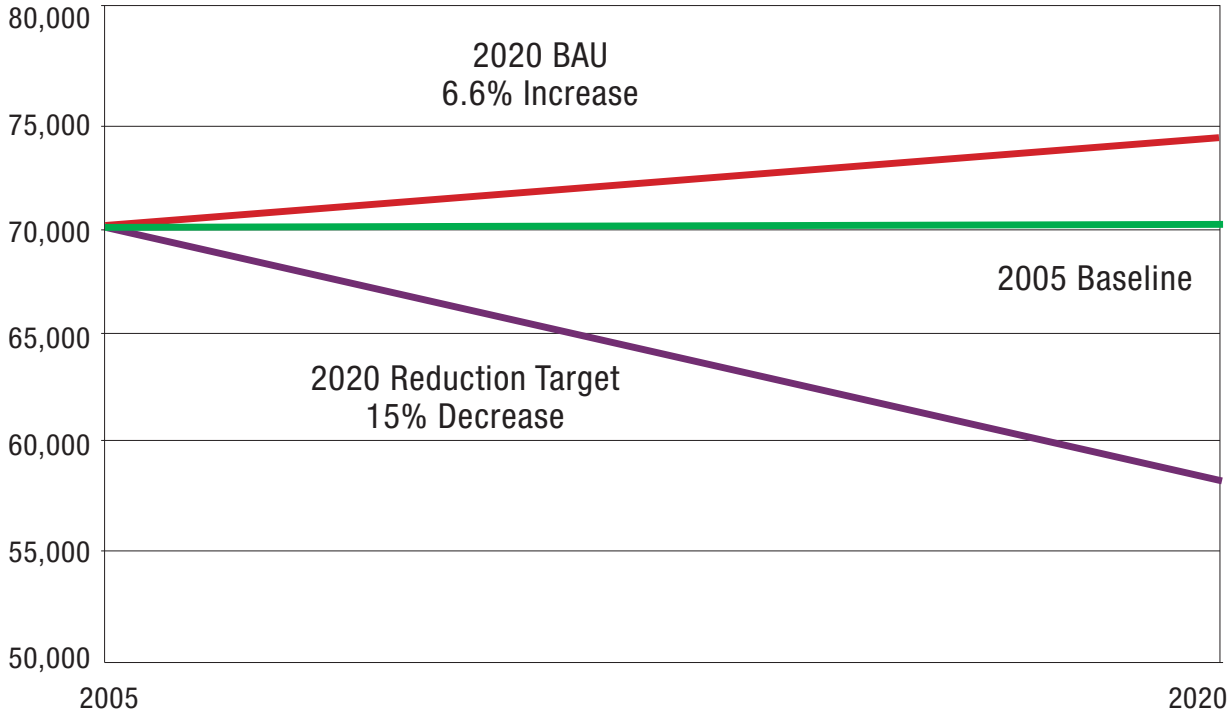
Sector	2005 (metric tons CO_2e)	2020 (metric tons CO_2e)	Annual Growth Rate	Percent Change from 2005 to 2020
Residential	23,850	23,850	0.00%	0.0%
Commercial	7,396	7,500	0.09%	1.4%
Transportation	36,292	40,777	0.78%	12.4%
Waste	2,168	2,168	0.00%	0.0%
TOTAL	69,706	74,295	0.43%	6.6%

11 http://www.energy.ca.gov/2007publications/CEC-200-2007-015/CEC-200-2007-015-SF2.PDF
12 Transportation 2035 Plan for the San Francisco Bay Area - Travel Forecasts Data Summary, Tables F.13 and F.20.

2.4 Greenhouse Gas Emissions Reduction Target

This Climate Action Plan proposes an emissions reduction target of 15% below 2005 levels by 2020, which is consistent with the State's direction to local governments in the AB 32 Scoping Plan.[13] A target of 15% below 2005 emissions levels would limit community emissions to 59,250 metric tons in 2020. Figure 7 provides a comparison of the business-as-usual (BAU) forecast for 2020 to the 2005 baseline year and the 15% reduction target. Figure 7 is also a depiction of San Anselmo's challenge in attempting to meet its reduction targets. Emissions will continue to increase along the business-as-usual scenario while reduction efforts are initiated. Achieving the target is therefore more than a 15% decrease – rather, it is a 20.3% reduction from projected 2020 emissions levels for the San Anselmo community.

Figure 7: Emissions Reduction Target



13 California Air Resources Board, "Climate Change Scoping Plan," December 2008, p. 27, http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf, accessed 3/31/10.

3. ACTIONS TO REDUCE GREENHOUSE GAS EMISSIONS

3.1 Summary of Greenhouse Gas Reduction Strategies

The mitigation measures presented in this chapter, as summarized in the tables below, achieve greenhouse gas emissions reductions in the community of 13,172 metric tons CO_2e or approximately 19% below the 2005 baseline. When state reductions are added, emissions in San Anselmo would be approximately 28% below 2005 levels — enough to allow the Town to surpass a reduction target of 15% below the 2005 baseline by 2020.

Within government operations, the Town could achieve reductions of 256 metric tons CO_2e, or approximately 40.4% below 2005 levels by implementing all of the specific, measurable actions listed in the following sections. A wide range of programs that exceed the Town's reduction goal have been included to allow for the consideration and prioritization of each program, based on its estimated cost, annual savings, and GHG reduction benefit, during the consideration of new programs, development projects, and funding opportunities. State actions would reduce emissions by another 6.3%, and programs to offset emissions could reduce emissions by an additional 27.3%.

Table 3: Mitigation Measures for Community Emissions

Section		GHG Reductions (Metric Tons)
3.2	Natural Systems, Sequestration and Carbon Offsets	814
3.3	Land Use and Transportation	2,125
3.4	Green Building, Energy Efficiency and Renewable Energy	9,287
3.6	Waste Reduction, Recycling and Zero Waste	838
3.7	Water and Wastewater	922
	SUBTOTAL	13,172
	% below 2005 levels	18.9%
3.8	State Actions	6,176
	% below 2005 levels	8.9%
TOTAL		19,348
Cumulative % below 2005 levels (Goal: 22.2%)		27.8%

Table 4: Mitigation Measures for Government Operations Emissions

Section		GHG Reductions (Metric Tons)
3.2	Natural Systems and Sequestration (excluding Carbon Offsets)	2
3.3	Land Use and Transportation	56
3.4	Green Building, Energy Efficiency and Renewable Energy	185
3.5	Green Purchasing	1
3.6	Waste Reduction, Recycling and Zero Waste	11
	SUBTOTAL	256
	% below 2005 levels	40.4%
3.8	State Actions	40
	% below 2005 levels	6.3%
3.2	Carbon Offsets	173
	% below 2005 levels	27.3%
TOTAL		469
Cumulative % below 2005 levels (Goal: 15%)		74.1%

3.2 Natural Systems, Sequestration and Carbon Offsets

The natural environment has been extensively altered by human civilization, often with little consideration for how natural systems function, depriving us of the important benefits they offer. Clearing and draining of wetlands, forestlands, grasslands and other open space for agricultural production or urban development decreases or eliminates the capacity of those natural systems to store carbon. The carbon dioxide stored in soil, trees and other ve¬getation is released into the atmosphere when forestland and open space is converted to other uses. Restoration of these natural areas, and establishment of new ones, has the potential to tie up or sequester greenhouse gas emissions in the form of soil and wood carbon.

This section of San Anselmo's Climate Action Plan highlights carbon sequestration through the restoration and establishment of natural areas, as well as measures to offset the community's greenhouse gas emissions.

Table 5: Section 3.2 Community Mitigation Measures

Mitigation Measures for Community		
Measure		GHG Reductions (Metric Tons)
3.2.C1	Increase Trees and Vegetation to Achieve a Net Gain of 50 Trees	2
3.2.C2	Offset Emissions from 5% of Natural Gas Use	812
	TOTAL	816
	% Reduced from 2005 Levels	1.2%

Table 6: Section 3.2 Government Operations Mitigation Measures

Mitigation Measures for Government Operations				
Measure		Cost to Implement	Annual Savings	GHG Reductions (Metric Tons)
3.2.G1	Increase Public Trees and Vegetation to Achieve a Net Gain of 50 Trees	$10,000	n/a	1.9
3.2.G2	Offset Emissions from Natural Gas Use	$687 per year	n/a	62.0
3.2.G3	Offset Emissions from Town Vehicles	$1,457 per year	n/a	111.0
	TOTAL			174.9
	% Reduced from 2005 Levels			27.6%

Recommended Actions:

1. Continue to enforce policies and programs that regulate the removal and replacement of significant trees, while maintaining consistency with the Town's Wildland Urban Interface requirements.

2. Support efforts to develop and implement a community-wide tree planting program, outside of the Town's Wildland Urban Interface zone, for streets and parks to significantly increase the carbon storage potential of trees and other vegetation in the community.

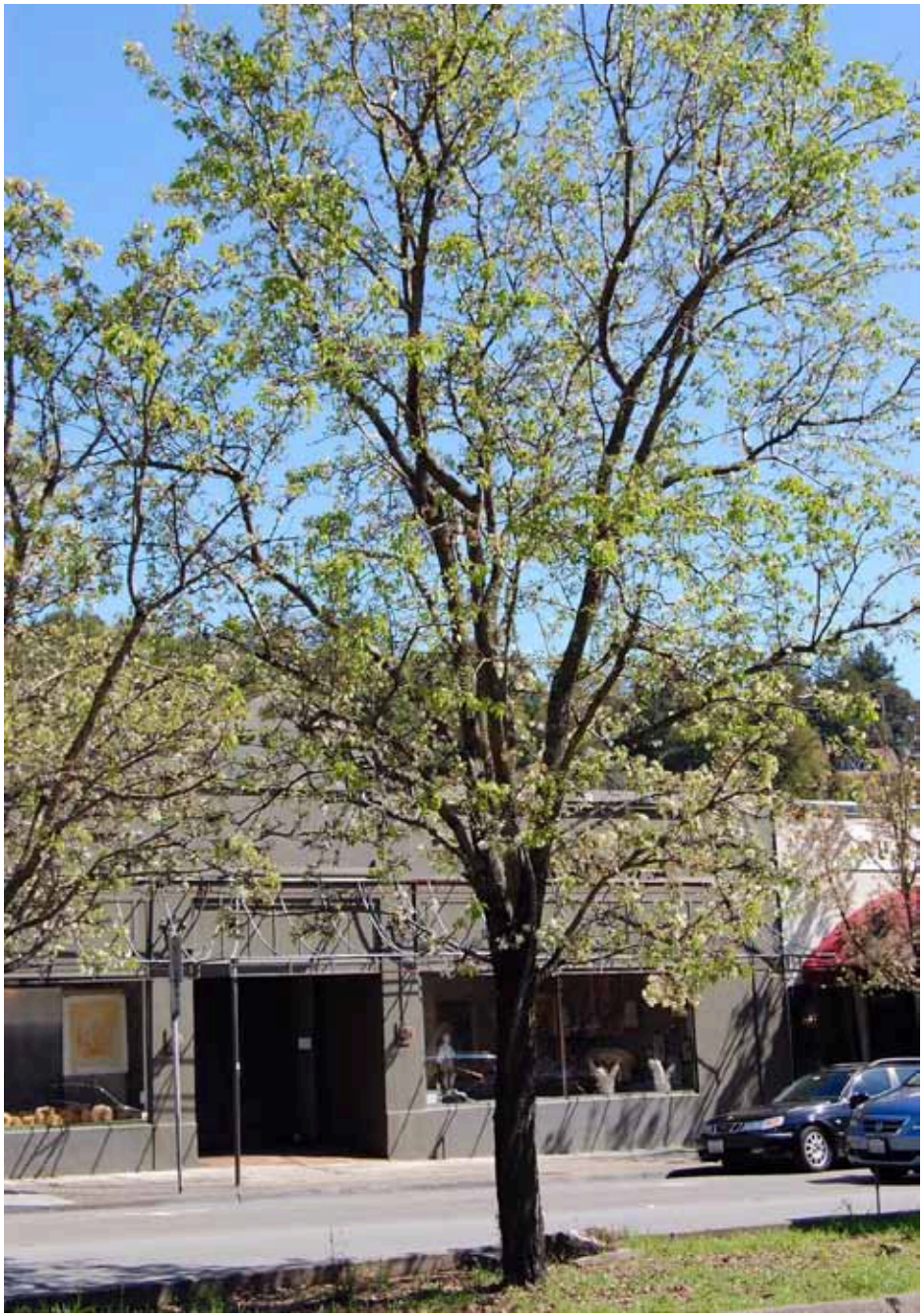
3. Within the confines of the Town's Wildland Urban Interface requirements, require new development to be planned around existing trees and require new or replacement tree planting as carbon offsets where increased intensity of use, development or activity results in increased GHG emissions.

4. Support the preservation and creation of conservation areas that provide carbon sequestration benefits, such as those with tree cover.

5. Encourage the creation of community gardens, including possible use of surplus Town properties.

6. Achieve further carbon reductions for Town operations by purchasing carbon offsets or participating in programs such as ClimateSmart, after maximizing GHG reductions through conservation, energy efficiency and renewable energy measures. Consider fiscal impacts of purchasing carbon offsets before participating in these programs.

7. Achieve further carbon reductions for Town fleet operations by purchasing carbon offsets through a program such as TerraPass, after maximizing GHG reductions through alternative transportation measures.



3.3 Transportation and Land Use

Transportation and land use development are strongly interrelated. The more suburban the development (i.e., low density housing which causes residents to live further from urban centers), the less viable are mass transit systems and other alternative modes of transportation such as walking or biking, and the more dependent residents become on the automobile. Studies have shown that people who live near transit drive between 10 and 30% less and that low-density suburban development generates twice as much GHG emissions per capita than a more dense urban development pattern. As a result, the transportation sector is one of the largest sources of GHG emissions. Though Marin County is known for its environmental consciousness, it is also known for its low-density developments, larger homes, multi-vehicle households, and consumerism. It also ranks among the highest in the U.S. in terms of per capita GHG emissions.

Schools in Marin County also generate a high number of vehicle trips. According to the Transportation Authority of Marin, 21% of all AM peak hour trips are home-to-school trips. More students could be encouraged to walk or bike to school through safety enhancements and an expanded bike and pedestrian network.

Table 7: Section 3.3 Community Mitigation Measures

Mitigation Measures for Community		
Measure		GHG Reductions (Metric Tons)
3.3.C1	Encourage Workforce Housing and Transit-oriented Development	23
3.3.C2	Increase Walking and Biking for Local Trips	524
3.3.C3	Increase Public Transit Use	535
3.3.C4	Increase Ridesharing	311
3.3.C5	Accelerate Adoption of Electric Vehicles	731
	TOTAL	2,125
	% Reduced from 2005 Levels	3.0%

Table 8: Section 3.3 Government Operations Mitigation Measures

Mitigation Measures for Government Operations				
Measure		Cost to Implement	Annual Savings	GHG Reductions (Metric Tons)
3.3.G1	Replace Town Vehicles with Hybrid or Electric Vehicles	As replaced	$3,445	9.9
3.3.G2	Encourage Town Employees to Commute by Alternative Means of Transportation	Variable	n/a	19.5
3.3.G3	Replace Police Vehicles with More Fuel-Efficient Vehicles	As replaced	$10,345	26.0
	TOTAL			55.5
	% Reduced from 2005 Levels			8.8%

Recommended Actions:

1. Reduce GHG emissions through the General Plan and project review processes.
   a. Promote compact and efficient development, such as orienting new development to capitalize on access to public transportation and local services and shopping.
   b. Encourage a "balanced" community, where residents do not have to travel long distances for service needs.
   c. Promote the development of workforce housing for local employees and second units for in-home providers of childcare, healthcare, building and grounds maintenance, and others.
   d. Make reductions in vehicle miles traveled (VMT) and the use of alternative transportation high-priority criteria in the evaluation of policy, program and project alternatives.

2. Encourage bicycling and walking as a safe and efficient means to travel around San Anselmo.
   a. Provide and maintain Class I, II and III bikeways as identified in the San Anselmo Bicycle and Pedestrian Plan.
   b. Improve bicycle and pedestrian safety at intersections and install bicycle loop detectors at signalized intersections to help cyclists trip the traffic signal.
   c. Install traffic calming measures to control speeding and improve pedestrian and cyclist safety.
   d. Implement "Complete Streets" policies to ensure the needs of bicyclists, pedestrians and the disabled are considered in the transportation element of any new capital improvement or development project.
   e. Install walkways where feasible to provide a continuous pedestrian network.
   f. Provide bicycle racks at public destinations as identified in the San Anselmo Bicycle and Pedestrian Plan.
   g. Require the provision of bicycle parking at all town-permitted large events.
   h. Encourage employers to provide secure, covered bicycle parking and shower and changing facilities for employees.
   i. Promote "Share the Road" strategies to improve bicycle safety and improve compliance with traffic laws.
   j. Participate in programs that encourage bicycling and walking, such as Safe Routes to School programs.
   k. Expand bicycle access to buses by providing bike parking at bus stops.

3. Support and promote public transit.
   a. Work with neighboring cities, regional transit providers and the Transportation Authority of Marin to increase both the frequency and types of transit services available to San Anselmo residents, employees and visitors.

4. Support and promote ridesharing and car sharing programs.
   a. Encourage the creation of a system to facilitate informal carpools for San Anselmo commuters.
   b. Promote ridesharing programs, such as SchoolPool Marin and 511 Rideshare.
   c. Work with the County to develop a community car sharing program, when determined to be feasible.

5. Educate residents and employees about the health and environmental benefits of walking, cycling, taking public transit and ridesharing, and provide information to assist in these modes of travel (e.g., information available in public places and employment centers regarding bus schedules, pedestrian pathways, bikeways and ridesharing programs).

6. Support and promote local farmers markets.

7. Encourage the use of fuel-efficient and low GHG-emitting vehicles and driver behaviors.
   a. Encourage private development to provide prioritized parking for hybrid, electric and carpool vehicles.
   b. Adopt and implement a policy requiring limitations on idling for commercial vehicles, construction vehicles, buses and other similar vehicles beyond state law, where feasible.

8. Purchase or lease low or zero-emissions vehicles and the most fuel efficient models possible for the Town fleet, including police patrol cars and construction vehicles.

9. Provide Town employees with incentives to use alternatives to single occupant auto commuting, such as transit incentives, bicycle facilities, ridesharing services and subsidies, flexible schedules and telecommuting when practical.

10. Increase ownership of plug-in electric vehicles (EV) by providing EV charging station infrastructure, where appropriate, and encouraging property owners and developers to install EV charging stations in commercial and residential projects.

3.4 Green Building, Energy Efficiency And Renewable Energy

The two fundamental means for reducing emissions from electricity and natural gas use are decreasing consumption through efficiency and switching from fossil fuels to renewable sources. According to the U.S. Department of Energy, buildings account for approximately 39% of total energy use, over 12% of the total water consumption, 68% of total electricity consumption, and 38% of all carbon dioxide emissions annually in the United States.

Increasing the efficiency of buildings is the most cost-effective approach for reducing greenhouse gas emissions. Programs which require minimum energy efficiency upgrade for home remodeling, such as increasing insulation and sealing heating ducts, have demonstrated energy savings of up to 20%.

New construction techniques and building materials, known collectively as "green building," can significantly reduce the use of resources and energy and creation of waste in our homes and commercial buildings. Green construction methods can be integrated into buildings at any stage, from design and construction to renovation and deconstruction.

San Anselmo requires new residential buildings greater than 500 square feet, residential additions, non-residential buildings, and government buildings to meet certain green building requirements. The Town's green building ordinance was adopted in 2010, and it is modeled on a countywide ordinance that increases building and energy efficiency standards above existing State mandates.

In order to avoid double counting of emissions reductions, mitigation measures in this climate action plan assume all of the measures are implemented. In this section, the government operations emissions reduction assumes all building energy efficiency upgrades, street light and traffic signal retrofits, and solar energy projects are implemented, and then calculates the cost and emissions reduction to purchase 100% renewable energy from Marin Clean Energy for the remaining electricity demand. The Town could also consider purchasing 100% renewable energy for all of its current electricity demand at an estimated cost of $6,865 per year and implementing efficiency and renewable energy projects at a later date. This action would result in an estimated greenhouse gas reduction of 153 metric tons, and would reduce Town emissions by 24% below 2005 levels.

Table 9: Section 3.4 Community Mitigation Measures

Mitigation Measures for Community		
Measure		GHG Reductions (Metric Tons)
3.4.C1	Improve Energy Efficiency in 20% of Existing Residential Buildings	954
3.4.C2	Improve Energy Efficiency in 20% Existing Commercial Buildings	296
3.4.C3	Reduce Energy Use in New and Substantially Remodeled Residential Buildings	116
3.4.C4	Reduce Energy Use in New Commercial Buildings	13
3.4.C5	Install Solar Energy Systems in 20% of Existing Residential Buildings	1,294
3.4.C6	Install Solar Energy Systems in 15% of Existing Commercial Buildings	560
3.4.C7	10% of Ratepayers Purchase Marin Clean Energy Deep Green Electricity	829
3.4.C8	70% of Ratepayers Purchase Marin Clean Energy Light Green Electricity	5,224
	TOTAL	9,287
	% Reduced from 2005 Levels	13.3%

Table 10: Section 3.4 Government Operations Mitigation Measures

Mitigation Measures for Government Operations				
Measure		Cost to Implement	Annual Savings	GHG Reductions (Metric Tons)
3.4.G1	Install Energy Efficiency Upgrades in Town Buildings	$103,405	$6,219	30.9
3.4.G2	Install Solar Energy System at Town Hall	$102,000	$3,170	4.1
3.4.G3	Install Solar Energy System at Corporation Yard	$37,000	$1,153	1.5
3.4.G4	Install Solar Energy System at Isabel Cook Community Center	$601,000	$18,731	24.5
3.4.G5	Upgrade Street Lighting to Energy-efficient Technologies (LED)	$301,931	$17,949	31.7
3.4.G6	Upgrade Traffic Signals to Energy-efficient Technologies (LED)	$7,875	$2,821	0.3
3.4.G7	Purchase Marin Clean Energy Deep Green Electricity for Government Facilities	$4,120 per year	n/a	92.1
	TOTAL			185.1
	% Reduced from 2005 Levels			29.2%

Recommended Actions:

1. Develop a town-wide green building promotional campaign. Educate Town staff and policy makers about best practices; provide checklists and specification guidelines for contractors; post green building information on the Town's website.

2. Provide incentives to development projects that exceed adopted green building standards.

3. Adopt an ordinance to require the Town to inform property owners of recommended energy upgrades at time of property sale, such as weather stripping doors and windows and stopping air leaks.

4. Support efforts of PG&E and the Marin Energy Authority to maximize residential and business subscription rates for energy efficiency programs and to promote conservation and renewable energy use.

5. Support efforts of Marin Clean Energy to increase the renewable content of the electricity provided to San Anselmo residents, businesses and municipal operations.

6. If available, participate in a countywide or regional property assessment district financing program to assist property owners in funding installation of energy efficiency upgrades and renewable energy systems.

7. Adopt policies and incentives to encourage residents and businesses to install solar and renewable energy systems, including solar panels to generate electricity and solar water heating systems, and to construct solar ready buildings.

8. Complete energy efficiency upgrades to Town facilities as recommended by the Marin Energy Management Team.

9. Replace street lights and parking lot lights with energy-efficient technologies, such as LED lighting.

10. Install photovoltaic panels at Town Hall, the Corporation Yard, and the Isabel Cook Community Center, if feasible.

11. Consider purchasing Marin Clean Energy Deep Green 100% renewable electricity for all Town operations.

3.5 Green Purchasing

By adopting environmentally preferable purchasing standards and policies, San Anselmo can measurably reduce its GHG emissions, while benefiting from reduced toxic exposures, pollution prevention, and, in many instances, reduced operating costs. Often, purchases that are environmentally preferable are also fiscally preferable. These include energy star certified appliances, high-efficiency lighting and HVAC units, duplexing printers, and more.

Many durable manufactured goods – from computers to motor vehicles — embody much of the energy used (and carbon emitted) over their life span in their initial production. Optimizing purchasing schedules according to ongoing needs assessment, rather than a fixed replacement schedule, can lower the environmental burden and cost.

Recommended Actions

1. Prioritize purchases of products and services with superior environmental performance and purchase Energy Star-rated office equipment and appliances.

2. Implement operational policies to reduce energy use and conserve resources, such as setting the printer's default option to duplex printing. Continue to shut off computers and imaging equipment at night.

3. Purchase products only when needed and not solely on a replacement schedule.

4. Create an interdepartmental Green Team to review and implement a Green Purchasing Policy & Implementation Plan. Engage Town staff in support and implementation of green purchasing goals and processes.

5. Provide each Town department with an easy reference binder for finding "green" products and distributors.

6. Continue to purchase office paper with 30% recycled content.

Table 11: Section 3.5 Government Operations Mitigation Measures

Mitigation Measures for Government Operations				
Measure		Cost to Implement	Annual Savings	GHG Reductions (Metric Tons)
3.5.G1	Upgrade to Energy Star-Rated Office Equipment	At time of replacement	$248	0.3
3.5.G2	Purchase 30% Recycled Paper	$77/year	n/a	0.6
	TOTAL			0.9
	% Reduced from 2005 Levels			0.2%

3.6 Waste Reduction, Recycling and Zero Waste

The reduction of waste, as well as the reuse and recycling of products, is key to reducing impacts on the environment. It is necessary to rethink what has traditionally been regarded as garbage and treat all materials as valued resources instead of items to discard. This requires shifting consumption patterns, more carefully managing purchases, and maximizing the reuse of materials at the end of their useful life.

The Town of San Anselmo is a member of the Marin Hazardous and Solid Waste Joint Powers Authority (JPA), which works with private waste haulers and facility operators to implement recycling programs and achieve state-mandated targets for waste diversion rates. Marin County has a high rate of diversion, with a current rate of about 72%.

In 2009, the JPA completed a zero-waste feasibility study which concluded that between 75% and 80% of the material that goes to the landfill can be diverted. Currently the JPA is targeting the diversion of food waste and demolished building materials to increase the county's diversion rate. The JPA has embraced an aggressive goal for achieving zero waste based upon realizing 80% diversion of waste from disposal by 2012 and achieving zero waste by 2025.

The JPA supports the collection and processing of green waste and food waste to create electricity from methane gas. The waste is processed in anaerobic digesters for soil amendments and the production of biogas. Biogas is the gas produced by anaerobic digestion of organic matter and consists of 60-80% methane (natural gas), 30-40% carbon dioxide, and other trace gases such as hydrogen sulfide, ammonia and hydrogen. The predominance of methane means it can be used as a fuel source.

The JPA proposes that the member agencies endorse an Extended Producer Responsibility resolution and sign the California Product Stewardship Council pledge to shift California's product waste management system from one focused on government funded and ratepayer financed waste diversion to one that relies on extended producer responsibility (EPR) in order to reduce public costs and drive improvements in product design that promote environmental sustainability.

Table 12: Section 3.6 Community Mitigation Measures

Mitigation Measures for Community		
Measure		GHG Reductions (Metric Tons)
3.6.C1	Divert All Food Waste from Landfill	395
3.6.C2	Reduce All Other Solid Waste Disposal to Landfills by 25%	443
	TOTAL	838
	% Reduced from 2005 Levels	1.2%

Table 13: Section 3.6 Government Operations Mitigation Measures

Mitigation Measures for Government Operations				
Measure		Cost to Implement	Annual Savings	GHG Reductions (Metric Tons)
3.6.G1	Reduce Solid Waste Disposal to Landfill by 25%	n/a	n/a	10.5
	% Reduced from 2005 Levels			1.7%

Recommended Actions:

1. Adopt a resolution to achieve zero waste going to landfills.

2. Endorse an Extended Producer Responsibility resolution as proposed by the JPA.

3. Provide education and publicity about reducing waste and available recycling services.

4. Adopt local amendments to the 2010 California Green Building Standards Code to require 50% construction and demolition waste diversion for construction, demolition and renovation projects, as proposed in the JPA's model ordinance.

5. Adopt and enforce a multi-family dwelling and business recycling ordinance.

6. Review and amend the Town's franchise agreement with its waste hauler to ensure waste reduction and diversion rates are maximized.

7. Promote commercial and residential composting.
   a. Partner with Master Gardeners and others to provide education and resources to residents on backyard and curbside composting.
   b. Work with Marin Sanitary Service to promote commercial and residential food waste collection in San Anselmo and to create centrally located facilities to compost all green and food waste and process it into biogas.

8. Strengthen recycling programs, purchasing policies, and employee education at Town facilities.

3.7 Water and Wastewater

Water demand in California is increasing because of population expansion. In addition, demand for water for irrigation rises with warmer temperatures. The actual impacts of the climate-induced change in water quality, quantity and demand will depend on the changes in water policy and operations, and on the water use patterns of all communities.

The Marin Municipal Water District (MMWD) supplies clean drinking water to a 147 square-mile area of south and central Marin. MMWD's water comes from three main sources: local reservoirs, the Russian River in Sonoma County and recycled water.

San Anselmo falls within MMWD's jurisdiction and all properties in San Anselmo are subject to the agency's water conservation regulations. The water conservation requirements, particularly irrigation efficiency, are fairly complex, and the Town relies on MMWD to provide technical review and oversight on water conservation and direction in regard to drought-tolerant landscaping. In December 2010, MMWD updated their regulations to comply with CALGreen, the State's new Green Building code. The new CALGreen code requires every new building to reduce indoor and outdoor water use by 20%. MMWD has also adopted water-efficient landscaping requirements that apply to all newly constructed and rehabilitated developer-installed residential landscapes of 1,000 square feet or greater, as well as homeowner residential projects of 2,500 square feet or greater.

In 2007, MMWD adopted a Water Conservation Plan intended to reduce water usage by approximately 9% by 2020. At the end of fiscal year 2009-2010, water usage had fallen 8.7% below 2005 levels. Additional water conservation measures could further reduce greenhouse gas emissions in San Anselmo. The most effective way to reduce emissions from water use is by reducing hot water use, as an estimated 35% of energy used in homes is for water heating.

Table 14: Section 3.7 Community Mitigation Measure

Mitigation Measures for Government Operations		
Measure		GHG Reductions (Metric Tons)
3.7.C1	Reduce Hot Water Use in Community by 15%	922
	% Reduced from 2005 Levels	1.3%

Recommended Actions:

1. Assess, maintain and repair existing plumbing fixtures, pipes, and irrigation systems in all Town buildings and facilities to minimize water use, including landscaping, public rest rooms and parks, and other recreational facilities. As feasible, upgrade and retrofit agency plumbing and irrigation systems with state-of-the-art water conserving technology.

2. Plant materials native to northern California and Marin County, and encourage the use of drought-tolerant plant material.

3. Minimize turf areas and avoid narrow turf areas, such as in parking strips. Encourage homeowners to avoid turf and replace existing turf areas.

4. Consider solar hot water and water heater upgrade incentives.

5. Conduct water audits on remodels and new homes.

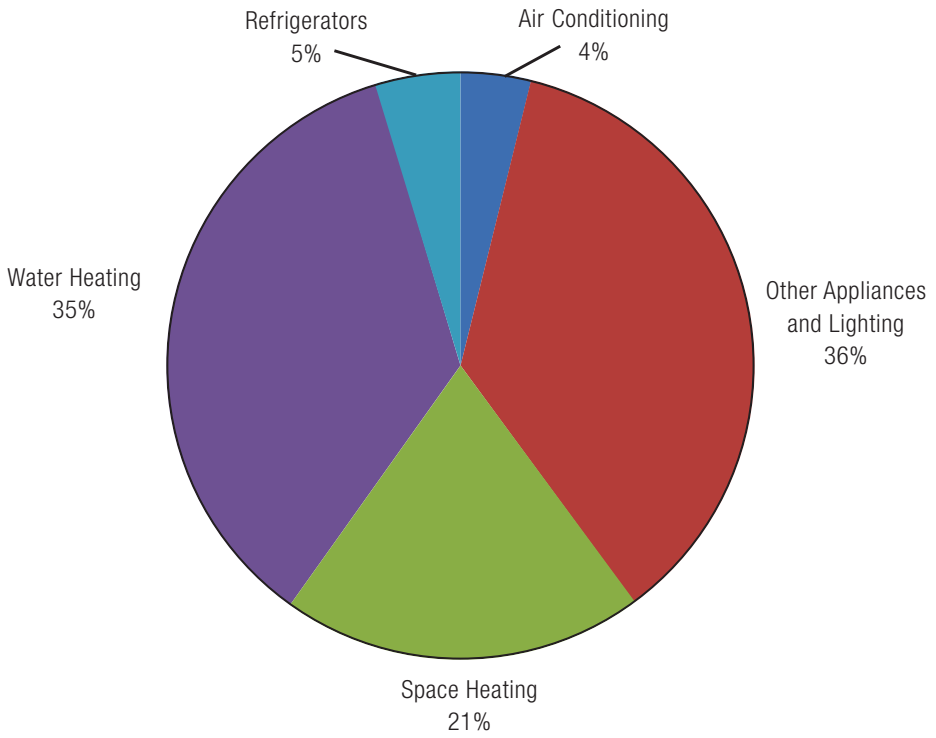
6. Adopt a retrofit program to encourage or require installation of water conservation measures in existing businesses and homes.

7. Provide education about water conservation and available programs and incentives.

8. Allow for the use of grey water for irrigation and other suitable uses to decrease the amount of potable water need by the community.

9. Work cooperatively with MMWD to enforce water conservation requirements and participate in water conservation outreach programs.

Figure 8: Energy Used in California Homes (2005)



SOURCE: U.S. Energy Information Administration, 2005 Residential Energy Consumption Survey

3.8 State Actions

The following are state reduction strategies included in the AB 32 Scoping Plan and accounted for in the Town's adjustment of the business-as-usual forecast. To clarify, the State of California has approved, programmed, and/or adopted these actions. Furthermore, they are programs or projects that require no local involvement. Incorporating them into the forecast and reduction assessment provides a more accurate picture of future emissions growth and the responsibility for action.

Table 15: Section 3.8 Community Mitigation Measures

Measure		GHG Reductions (Metric Tons)
3.8.C1	PG&E Achieves 33% Renewable Portfolio Standard by 2020	792
3.8.C2	AB 1493 Pavley Standards	2,812
3.8.C3	Low Carbon Fuel Standard	2,572
	TOTAL	6,176
	% Reduced from 2005 Levels	8.9%

Table 16: Section 3.8 Government Operations Mitigation Measures

Measure		GHG Reductions (Metric Tons)
3.8.G1	AB 1493 Pavley Standards	20.8
3.8.G2	Low Carbon Fuel Standard	19.1
	TOTAL	39.9
	% Reduced from 2005 Levels	6.3%

Low Carbon Fuel Standard

The State is proposing to reduce the carbon intensity of transportation fuels consumed in California. To achieve this, CARB is developing a Low Carbon Fuel Standard (LCFS), which would reduce the carbon intensity of California's transportation fuels by at least 10% by 2020 and 20% by 2035 as called for by Governor Schwarzenegger in Executive Order S-01-07. LCFS will incorporate compliance mechanisms that provide flexibility to fuel providers in how they meet the requirements to reduce greenhouse gas emissions. CARB estimates the Low Carbon Fuel Standard will reduce California's projected 2020 transportation emissions by 6.7%.

Pavley (AB 1493)

Assembly Bill 1493 (Pavley), signed into law in 2002, will require carmakers to reduce greenhouse gas emissions from new passenger cars and light trucks beginning in 2011. The California Air Resources Board adopted regulations in September 2004 that create two phases of increasingly stringent standards for car manufacturers between 2009 and 2020. The first phase, which has already been adopted, is expected to reduce California's projected 2020 transportation emissions by 7%.

Renewable Portfolio Standard (RPS)

Established in 2002 in Senate Bill 1078, the RPS program requires electricity providers to increase the portion of energy that comes from renewable sources to 20% by 2010 and to 33% by 2020. CARB estimates the RPS will reduce California's emissions from electricity use by 15.3% in 2020.

3.9 Adaptation

As the climate changes, so must San Anselmo. To effectively address the challenges that a changing climate will bring, the Town must not only reduce its greenhouse gas emissions, but be prepared to respond to the expected impacts of climate change. Many of the mitigation measures incorporated in this Climate Action Plan will help the community prepare for the effects of climate change. Reducing water use will ease competition for limited water supplies expected from higher temperatures and reduced snowmelt, while reducing electricity use will help ease demand for diminishing hydroelectric power. Other expected effects from climate change – such as a higher frequency of large damaging fires and pest and insect epidemics – must be anticipated through adequate public safety, emergency, and public health responses.

Recommended Actions:

1. Incorporate the likelihood of climate change impacts into Town emergency planning and training.

2. Partner with neighboring municipalities and regional agencies to develop and implement regional adaptation programs.

3. Encourage Federal, State and local agencies to be pro-active and supportive of efforts to combat the expected rise in sea levels.

4. Coordinate internally and with water districts, wildlife agencies, flood control and fire districts, Marin County, and other relevant organizations. Address human health and the health and adaptability of natural systems, including the following:
   a. Water resources including expanded rainwater harvesting, water storage and conservation techniques, water reuse, and water-use and/or irrigation efficiency.
   b. Biological resources including land acquisition, creation of marshlands/wetlands as a buffer against sea level rise and flooding, and protection of existing natural barriers.
   c. Public health including heat-related health plans, vector control, safe water, and improved sanitation.
   d. Environmental hazards including seawalls, storm surge barriers, and fire protection.

4. PLAN IMPLEMENTATION

San Anselmo recognizes that responding to and preparing for climate change is a critical step toward a sustainable future. The Town's early actions to reduce its contribution to climate change reflect the Town's history and commitment to decrease the impacts of day-to-day activities on the natural environment while enhancing its vibrant quality of life. Mitigating climate change will require everyone – residents, businesses, government agencies and nonprofit organizations – to work together to implement this plan.

This plan provides a strategy to achieve emission reductions that will achieve the Town's target of 15% below 2005 emissions by the year 2020. A wide range of programs that exceed the Town's reduction goal have been included to allow for the evaluation and prioritization of potential programs and capital improvement projects as new program and funding opportunities arise. Successful implementation of the plan will require staff and the Town Council to identify and commit resources to climate change mitigation activities, and to monitor and report on progress towards meeting emissions reduction goals.

Recommended Actions:

1. Monitor and report on the Town's progress annually.

2. Update the baseline greenhouse gas emissions inventory every five years.

3. Continue and expand public and private partnerships that support implementation of the Climate Action Plan, including membership in the Marin Climate and Energy Partnership.

4. Identify funding sources for recommended actions, and pursue local, regional, state and federal grants as appropriate.

5. Review and update the Climate Action Plan every five years.

6. Amend the Climate Action Plan as necessary to comply with state regulations.

APPENDIX A

Data Sources, Assumptions and Calculations

All 2005 greenhouse gas emissions data for community and government operations are from the Town of San Anselmo 2005 Greenhouse Gas Emissions Inventory, with emission factors as follows:

Emission Source	GHG	Emission Factor	Emission Factor Source
PG&E Electricity	CO_2	0.489155 lbs/kWh	The certified CO_2 emission factor for delivered electricity is publicly available at http://www.climateregistry.org/CarrotDocs/19/2005/2005_PUP_Report_V2_Rev1_PGE_rev2_Dec_1.xls
	CO_2e	0.492859 lbs/kWh	PG&E
Default Direct Access Electricity	CO_2	343.3 short tons/GWh	ICLEI/Tellus Institute (2005 Region 13 - Western Systems Coordinating Council/ CNV Average Grid Electricity Coefficients)
	CH_4	0.035 short tons/GWh	
	N_20	0.027 short tons/GWh	
Natural Gas	CO_2	53.05 kg/MMBtu	PG&E/CCAR. Emission factors are derived from: California Energy Commission, Inventory of California Greenhouse Gas Emissions and Sinks: 1990-1999 (November 2002); and Energy Information Administration, Emissions of Greenhouse Gases in the United States 2000 (2001), Table B1, page 140.
	CH_4	0.0059 kg/MMBtu	CCAR. Emission factors are derived from: U.S. EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2000" (2002), Table C-2, page C-2. EPA obtained original emission factors from the Intergovernmental Panel on Climate Change, Revised IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual (1996), Tables 1-15 through 1-19, pages 1.53-1.57.
	N_20	0.001 kg/MMbtu	

Avoided emissions are calculated using 2005 emission factors for comparative purposes.

Population and household estimates and projections are from the Association of Bay Area Governments, "Projections and Priorities 2009: Building Momentum," August 2009.

3.2 Natural Systems, Sequestration and Carbon Offsets

Measure 3.2.C1: Increase Trees and Vegetation for a Net Gain of 50 Trees

Number of trees	50
Average sequestration per tree	83.52 pounds
Total CO_2 sequestered	1.9 metric tons

Data Source Notes and Assumptions: Average is based on tree species and diameters as listed on the County of Marin's "Trees Native to Marin County." Ordinance #3342, Attachment 1, http://www.co.marin.ca.us/depts/CD/Forms/00000049.pdf. Sequestration data from National Tree Benefit Calculator, www.treebenefits.com.

Measure 3.2.C2: Offset Emissions from Electricity and Natural Gas Use

Projected residential natural gas usage, year 2020	3,035,635 therms
5% natural gas usage reduced through offsets	151,782 therms
GHG emissions offset	812 metric tons

Data Source Notes and Assumptions: Assumes participation in PG&E's ClimateSmart program at 2009 costs of $0.06528 per therm. PG&E's ClimateSmart program allows customers to balance out the greenhouse gas emissions associated with their own natural gas and electricity use. Under the program, customers who participate are charged an extra $0.06528 per therm of natural gas, which is the volumetric rate set by the California Public Utilities Commission to make the GHG emissions associated with their home or business energy use "carbon neutral." The revenues from the program are used solely to invest in new GHG emission reduction projects in California, including forestry, dairy, and landfill methane capture that reduce or absorb GHGs such as carbon dioxide and methane. All of the GHG emission reduction projects are selected through a competitive solicitation with clear and stringent criteria and are independently verified under the rigorous protocols developed by the Climate Action Reserve (CAR), the successor organization to the California Climate Action Registry, to ensure the projects meet the commitment to make participating customers carbon neutral.

Measure 3.2.G1: Increase Trees and Vegetation for a Net Gain of 100 Trees

Number of trees	50
Average sequestration per tree	83.52 pounds
Total CO_2 sequestered	1.9 metric tons

Data Source Notes and Assumptions: Average is based on tree species and diameters as listed on the County of Marin's "Trees Native to Marin County." Ordinance #3342, Attachment 1, http://www.co.marin.ca.us/depts/CD/Forms/00000049.pdf. Sequestration data from National Tree Benefit Calculator, www.treebenefits.com.

Measure 3.2.G2: Offset Emissions from Natural Gas Use

Projected natural gas usage, year 2020	14,881 therms
Natural gas usage reduced through other measures	4,358 therms
Remaining natural gas usage to be offset	10,523 therms
Annual cost to offset natural gas	$687
GHG emissions to be offset	62.0 metric tons

Data Source Notes and Assumptions: Assumes participation in PG&E's ClimateSmart program at 2009 costs of $0.06528 per therm. PG&E's ClimateSmart program allows customers to balance out the greenhouse gas emissions associated with their own natural gas and electricity use. Under the program, customers who participate are charged an extra $0.06528 per therm of natural gas, which is the volumetric rate set by the California Public Utilities Commission to make the GHG emissions associated with their home or business energy use "carbon neutral." The revenues from the program are used solely to invest in new GHG emission reduction projects in California, including forestry, dairy, and landfill methane capture that reduce or absorb GHGs such as carbon dioxide and methane. All of the GHG emission reduction projects are selected through a competitive solicitation with clear and stringent criteria and are independently verified under the rigorous protocols developed by the Climate Action Reserve (CAR), the successor organization to the California Climate Action Registry, to ensure the projects meet the commitment to make participating customers carbon neutral.

Measure 3.2.G3: Offset Emissions from Town Vehicles

Projected Town vehicle emissions in 2020	147 metric tons
Emissions offset through other measures	36 metric tons
Remaining GHG emissions to offset	111 metric tons
Annual cost to offset vehicle emissions	$1,457

Data Source Notes and Assumptions: Assumes participation in a GHG offset program, such as TerraPass, a cost of $5.95 per 1,000 lbs. of emissions. TerraPass is a private company that sells carbon offsets to balance vehicle emissions. TerraPass funds three different types of carbon reduction projects: clean energy produced by wind power; landfill gas capture, and methane reduction projects at farms. TerraPass offsets are verified annually against broadly accepted standards by independent third party verifiers. Their primary standards are the latest version of the Voluntary Carbon Standard (issued in 2008) and the Climate Action Reserve.

3.3 Land Use and Transportation

Measure 3.3.C1: Encourage Workforce Housing and Transit-oriented Development

Number of new housing units projected, 2005-2020	50
Number of new TOD housing units projected, 2005-2020	30
Vehicle miles traveled (VMT) on local roads, projected 2020	75,234,294 VMT
Number of households, projected 2020	5,340
Local annual VMT per household, projected 2020	14,089
10% reduction in local VMT for transit-oriented units	42,266 VMT
Estimated reduction in GHG emissions	23 metric tons

Data Source Notes and Assumptions: Household projections from the Association of Bay Area Governments, "Projections and Priorities 2009: Building Momentum," August 2009. Number of new transit-oriented housing units provided by Town of San Anselmo Planning Department. Local roads Vehicle Miles Traveled (VMT) 2005 Data: Harold Brazil, Air Quality Associate, Metropolitan Transportation Commission (MTC), as reported in the Town of San Anselmo 2005 Greenhouse Gas Inventory. Projected VMT based on Travel Forecasts Data Summary: Transportation 2035 Plan for the San Francisco Bay, Metropolitan Transportation Commission, December 2008. Transportation greenhouse gas emissions are based on emission factors as reported in the Town of San Anselmo 2005 Greenhouse Gas Inventory as follows:

	CO_2 Rates (grams/mile)		CH4 Rates (grams/mile)		N2O Rates (grams/mile)		VMT Mix		CO_2 Rates- (grams/gallon)		Fuel Usage		Fuel Efficiency (miles/gallon)	
Area	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel
Marin County	476	1,426	0.065	0.03	0.07	0.05	95.50%	4.50%	8,628	9,957	89.20%	10.80%	18.1	7
BAAQMD Average	463	1,389	0.063	0.03	0.07	0.05	94.90%	5.10%	8,607	10,091	87.80%	12.20%	18.6	7.3

Measure 3.3.C2: Increase Walking and Biking for Local Trips

Average daily walking and bicycling for utilitarian purposes per adult in Marin	0.67 miles
Estimated annual walking and biking miles traveled in San Anselmo 2005	2,152,040 miles
Increase walking and biking miles traveled by 50% by 2020	1,076,020 miles
Estimated reduction in GHG emissions	524 metric tons

Data Source Notes and Assumptions: Average daily walking and bicycling data: Federal Highway Administration, "Interim Report to the U.S. Congress on the Nonmotorized Transportation Pilot Program SAFETEA-LU Section 1807," November 2007. According to this survey data, 11.8% of utilitarian trips in 2007 were made by walking and 1.8% by bicycle, for a total mode share of 13.6%. Estimated annual walking and biking miles in San Anselmo assumes same mileage for children, which were not surveyed due to privacy concerns.

Measure 3.3.C3: Increase Public Transit Use

Average daily transit miles per adult in Marin	1.37 miles
Estimated transit miles traveled in San Anselmo 2005	4,400,440 miles
Increase transit miles traveled by 25% by 2020	1,100,110 miles
Estimated reduction in GHG emissions	535 metric tons

Data Source Notes and Assumptions: Average daily transit data: Federal Highway Administration, "Interim Report to the U.S. Congress on the Nonmotorized Transportation Pilot Program SAFETEA-LU Section 1807," November 2007. According to this survey data, 3.2% of trips in 2007 were made using public transit. Estimated transit miles traveled in San Anselmo assumes same mileage for children, which were not surveyed due to privacy concerns.

Measure 3.3.C4: Increase Ridesharing

Projected local vehicle miles traveled in San Anselmo, 2020	75,234,294 miles
Ridesharing as a percentage of vehicle miles traveled, 2007	1.7%
Increase ridesharing miles traveled by 50% by 2020	639,492 miles
Estimated reduction in GHG emissions	311 metric tons

Data Source Notes and Assumptions: Rideshare data: Federal Highway Administration, "Interim Report to the U.S. Congress on the Nonmotorized Transportation Pilot Program SAFETEA-LU Section 1807," November 2007.

Measure 3.3.C5: Accelerate Adoption of Electric Vehicles

Projected transportation GHG emissions from local road VMT, 2020	40,777 metric tons
2% of emissions displaced by electric vehicles	816 metric tons
Electric vehicle VMT, 2020	1,504,686 VMT
Electric vehicle electricity use	376,171 kWh
Electric vehicle emissions from electricity use	84 metric tons
Estimated reduction in GHG emissions	731 metric tons

Data Source Notes and Assumptions: Assumes electric vehicle energy efficiency of 4 miles per kWh, a generally accepted estimate. The 2011 Nissan Leaf, for example, is advertised to have a range of up to 100 miles on full battery charge of 24 kWh, which equates to approximately 4 miles per kWh. This measure counts transportation emissions reductions San Anselmo could achieve by increasing the percentage of EVs in the community fleet 2% over State projections. For a discussion of the electric vehicle market and forecasts, see "Plugged in 2," Deutsche Bank, November 3, 2009, http://www.fullermoney.com/content/2009-11-03/ElectricCarsPluggedIn2.pdf. This report projects U.S. market shares in 2020 of 12% for hybrid electric vehicles, 7% for plug-in hybrid electric vehicles, and 4% for electric vehicles.

Measure 3.3.G1: Replace Town Vehicles with Hybrid or Electric Vehicles

Vehicle	Annual VMT	GHG Emissions	Replacement	New GHG Emissions	kWh Use for EV	Fuel Cost Savings	GHG Reduction
Community services patrol car	11,900	6.25	Electric Vehicle	0.66	2,975	$1,942	5.59
2001 Ford Taurus	9,214	4.84	Electric Vehicle	0.51	2,304	$1,504	4.33
TOTAL	21,114	11.09		1.17	5,279	$3,445	9.92

Data Source Notes and Assumptions: VMT data extrapolated from Town of San Anselmo 2005 Greenhouse Gas Emissions Inventory background data reports. The community services patrol car was a full-size vehicle in 2005 and was replaced with a hybrid vehicle. Assumes electric vehicle energy efficiency of 4 miles per kWh. Fuel cost savings assume an average price per gallon for gasoline of $3.50 and a per kWh cost of $0.1708.

Measure 3.3.G2: Town Employees Commute by Alternative Means of Transportation

Employee commute GHG, year 2005	195 metric tons
10% reduction	19.5 metric tons

Measure 3.3.G3: Replace Police Vehicles with More Fuel-Efficient Vehicles

Police vehicle fuel, year 2005	9,852 gallons
Police vehicle GHG emissions, year 2005	87.9 metric tons
Projected fuel reduction, year 2020	2,956 gallons
Projected fuel savings, year 2020	$10,345
Projected GHG emissions reduction, 2020	26.0 metric tons

Data Source Notes and Assumptions: Assumes fuel-efficient police vehicles will be available, such as vehicles currently in development by Carbon Motors. As advertised, these have an ultra low-sulfur, "clean" diesel engine and fuel system that will improve fuel efficiency by up to 40%. The Carbon Motors vehicle will have a combined city/highway fuel economy of 28-30 mpg. This estimate assumes a 30% improvement over 2005 patrol fleet fuel economy. Projected fuel savings assumes an average fuel cost of $3.50 per gallon.

3.4 Green Building, Energy Efficiency and Renewable Energy

Measure 3.4.C1: Improve Energy Efficiency in 20% of Existing Residential Buildings

Number of occupied households in 2005	5,290
Electricity use in residential sector in 2005	32,537,708 kWh
GHG emissions from residential sector in 2005	23,850 metric tons
Expected energy efficiency achieved	20%
Potential energy efficiency upgrade penetration	20%
Number of housing units improved	1,058
Estimated reduction in electricity use	1,301,508 kWh
Estimated GHG reduction in electricity use	305 metric tons
Total estimated GHG reduction	954 metric tons

Measure 3.4.C2: Improve Energy Efficiency in 20% Existing Commercial Buildings

GHG emissions from commercial sector in 2005	7,396 metric tons
Electricity use in commercial sector in 2005	17,860,418 kWh
Expected energy efficiency achieved	20%
Potential energy efficiency upgrade penetration	20%
Estimated reduction in electricity use	714,417 kWh
Estimated GHG reduction in electricity use	176 metric tons
Total estimated GHG reduction	296 metric tons

Measure 3.4.C3: Reduce Energy Use in New and Substantially Remodeled Residential Construction

Projected number of new homes and substantial remodels, 2005-2020	150
Average residential electricity use per household, 2005	6,151 kWh
Average natural gas use per household	573.8 therms
Reduction in electricity use due to CA 2008 Building Efficiency Standards 2010-2020	92,262 kWh
Reduction in natural gas use due to CA 2008 Building Efficiency Standards 2010-2020	8,608 therms
Reduction in electricity use from Green Building Ordinance 2010- 2020	18,452 kWh
Reduction in natural gas use from Green Building Ordinance 2010- 2020	8,608 therms
Estimated total reduction in electricity use	110,714 kWh
Estimated GHG reduction	116 metric tons

Data Source Notes and Assumptions: Assumes 50 new residential buildings and 100 substantial remodels between 2005-2010. According to the CEC, the 2008 Building Efficiency Standards, which took effect on January 1, 2010, require, on average, a 15% increase in energy efficiency savings compared with the 2005 Building Efficiency Standards. California Energy Commission, 2009 Integrated Energy Policy Report, Final Commission Report, December 2009, CEC -100-2009-003-CMF, p.5. San Anselmo's green building ordinance, adopted in 2010, requires an additional reduction from existing Title 24 Part 6 energy budget requirements for new single and two-family residential construction as follows: 500-3,999 sq. ft., 15%; 4,000 – 5,499 sq. ft., 20%; 5,500 – 6,999 sq. ft., 30%; over 7,000 sq. ft., net zero energy. The requirement for new multi-family buildings is 15% below Title 24 energy budget requirements. This analysis assumes an average 15% across all residential building types. Every 1% increase over Title 24 requirements is assumed to result in a 0.2% decrease in electricity use and a 1% decrease in natural gas use.

Measure 3.4.C4: Reduce Energy Use in New Commercial Construction

Projected increase in GHG emissions in commercial sector 2005-2020	104 metric tons
Projected increase in electricity use in commercial sector 2005-2020	250,547 kWh
Projected increase in natural gas use in commercial sector 2005-2020	7,873 therms
Reduction in electricity use due to CA 2008 Building Efficiency Standards 2010-2020	25,055 kWh
Reduction in natural gas use due to CA 2008 Building Efficiency Standards 2010-2020	787 therms
Reduction in electricity use from Marin Green BERST Standards 2010- 2020	3,341 kWh
Reduction in natural gas use from Marin Green BERST Standards 2010- 2020	525 therms
Estimated total reduction in electricity use	28,395 kWh
Estimated GHG reduction	13 metric tons

Data Source Notes and Assumptions: According to the CEC, the 2008 Building Efficiency Standards, which took effect on January 1, 2010, require, on average, a 15 percent increase in energy efficiency savings compared with the 2005 Building Efficiency Standards. California Energy Commission, 2009 Integrated Energy Policy Report, Final Commission Report, December 2009, CEC -100-2009-003-CMF, p.5. San Anselmo's green building ordinance, adopted in 2010, requires an additional 15% reduction from existing Title 24 Part 6 energy budget requirements for new commercial construction over 5,000 sq. ft. This analysis assumes an average 10% reduction across all commercial building sizes. Every 1% increase over Title 24 requirements is assumed to result in a 0.2% decrease in electricity use and a 1% decrease in natural gas use.

Measure 3.4.C5: Install Solar Energy Systems in 20% of Existing Residential Buildings

Annual electricity use in residential sector in 2005	32,537,708 kWh
GHG emissions from residential electricity use in 2005	7,614 metric tons
Number of households in 2005	5,290
Average annual residential energy use	6,151 kWh
% potential solar energy of total electricity use	85%
Potential solar system penetration	20%
Potential number of homes	1,058
Estimated electricity saved	5,531,410 kWh
Estimated GHG reduction	1,294 metric tons

Data Source Notes and Assumptions: Number of San Anselmo households in 2005 is based on estimates provided by the Association of Bay Area Governments (ABAG) Projections 2009. As of 12/29/10, San Anselmo had 140 small (under 10Kw) installed solar energy systems and a total capacity of 529 kW or approximately 3.8 kW per system, the majority of which are residential systems (Marin Energy Management Team and California Solar Initiative data). This number represents approximately 2.6% of the existing 5,290 housing units in San Anselmo. Solar installation in San Anselmo has occurred at a much greater rate than California (0.4%) and Marin County (1.1%).

Measure 3.4.C6: Install Solar Energy Systems in 15% of Existing Commercial Buildings

Annual electricity use in commercial sector in 2005	17,860,418 kWh
GHG emissions from commercial electricity use in 2005	4,394 metric tons
% potential solar energy of total electricity use	85%
Potential solar system penetration	15%
Estimated electricity saved	2,277,203 kWh
Estimated GHG reduction	560 metric tons

Measure 3.4.C7: 10% of Ratepayers Purchase Marin Clean Energy Deep Green Electricity

Projected electricity use in 2020	50,648,673 kWh
Less direct access electricity	2,446,231 kWh
Electricity use reduced by other measures	11,489,484 kWh
Electricity use added back for electric vehicles	376,171 kWh
Remaining electricity use	37,089,129 kWh
Projected Deep Green Electricity Use in 2020	10%
Projected Deep Green kWh in 2020	3,708,913 kWh
GHG emissions reductions	829 metric tons

Data Source Notes and Assumptions: Assumes 10% of PG&E ratepayers will purchase deep green, 100% renewable energy in 2020. As of December 2010, Marin Energy Authority had enrolled approximately 4% of its Phase I customer prospects throughout Marin in the deep green option.

Measure 3.4.C8: 70% of Ratepayers Purchase Marin Clean Energy Light Green Electricity

Projected electricity use in 2020	50,648,673 kWh
Less direct access electricity	2,446,231 kWh
Electricity use reduced by other measures	11,489,484 kWh
Electricity use added back for electric vehicles	376,171 kWh
Remaining electricity use	37,089,129 kWh
Projected Light Green Electricity Use in 2020	70%
Projected Light Green kWh in 2020	25,962,390 kWh
GHG emissions reduction	5,224 metric tons

Data Source Notes and Assumptions: Assumes 70% of PG&E ratepayers will purchase light green energy in 2020, and light green will be 90% greenhouse gas-free by 2020, as per Marin Energy Authority's projections. As of December 2010, Marin Energy Authority had enrolled approximately 76% of its Phase I customer prospects throughout Marin in the light green option.

Measure 3.4.G1: Install Energy Efficiency Upgrades in Town Buildings

Energy-Efficiency Project	Reduction in Annual Electricity Use (kWh)	Reduction in Annual Natural Gas Use (therms)	Estimated Project Cost	Annual Energy Cost Savings	Reduction in GHG emissions (metric tons)
Install energy-efficient lighting at Town Hall	9,821	0	$5,185	$1,542	2.20
Install energy-efficient lighting at Isabel Cook Community Center	24,472	0	$19,560	$3,842	5.47
Install energy-efficient lighting at Corporation Yard	342	0	$135	$46	0.08
Replace hot-water circulating pump motor at Isabel Cook Community Center	241	0	$1,075	$38	0.05
Modify radiator at Isabel Cook Community Center	0	110	$450	$132	0.58
Replace hot water boiler at Isabel Cook Community Center	0	709	Completed	Completed	3.76
Replace HVAC system at Town Hall	0	3,539	$77,000	$619	18.78
TOTAL	34,876	4,358	$103,405	$6,219	30.92

Data Source Notes and Assumptions: Proposed energy-efficiency projects, estimated project, and estimated energy savings based on Energy Management Study for the Town of San Anselmo prepared by the Marin Energy Management Team on June 6, 2007, and August 14, 2008.

Measure 3.3.G2: Install Solar Energy System at Town Hall

Facility	System Size KW AC	Annual kWh Produced	Project Cost	Annual Cost Savings	Reduction in GHG Emissions (metric tons)
Town Hall	11	18,557	$102,000	$3,170	4.2

Data Source Notes and Assumptions: PV system data provided by Dana Armanino, County of Marin, and from an application for Renewable Clean Energy Renewable Bonds dated July 13, 2007. Annual electricity cost savings are based on an average of summer and winter rates of .17082 per kWh from PG&E's A-1 Electric Rate Schedule, effective January 1, 2011.

Measure 3.4.G3: Install Solar Energy System at Corporation Yard

Facility	System Size KW AC	Annual kWh Produced	Project Cost	Annual Cost Savings	Reduction in GHG Emissions (metric tons)
Corporation Yard	4	6,748	$37,000	$1,153	1.5

Data Source Notes and Assumptions: PV system data provided by Dana Armanino, County of Marin, and from an application for Renewable Clean Energy Renewable Bonds dated July 13, 2007. Annual electricity cost savings are based on an average of summer and winter rates of .17082 per kWh from PG&E's A-1 Electric Rate Schedule, effective January 1, 2011.

Measure 3.4.G4: Install Solar Energy System at Isabel Cook Community Center

Facility	System Size KW AC	Annual kWh Produced	Project Cost	Annual Cost Savings	Reduction in GHG Emissions (metric tons)
Isabel Cook Community Center	65	109,655	$601,000	$18,731	24.5

Data Source Notes and Assumptions: PV system data provided by Dana Armanino, County of Marin, and from an application for Renewable Clean Energy Renewable Bonds dated July 13, 2007. Annual electricity cost savings are based on an average of summer and winter rates of .17082 per kWh from PG&E's A-1 Electric Rate Schedule, effective January 1, 2011.

Measure 3.4.G5: Upgrade Street Lighting to Energy-Efficient Technologies: LED Retrofit

Lamp Type	Quantity	Annual Energy Use (kWh)	Annual Cost	GHG Emissions (metric tons)	Potential Replacement Lamp*	Annual Energy Use (kWh)	Annual Cost	GHG Emissions (metric tons)	Replacement Cost	Reduction in Annual Energy Use (kWh)	Reduction in Annual Operating Cost	GHG Emissions Reduction (metric tons)
HPS 70w, 120v	343	119,364	$14,505	26.68	LED 42w	59,682	$6,404	13.34	$190,365	59,682	$8,100	13.34
HPS 70w, 120v	170	59,160	$7,189	18.70	Induc 40w	28,560	$3,470	6.38	EECBG Grant	30,600	$3,719	6.84
HPS 70w, 240v	1	408	$50	0.09	LED 42w	174	$19	0.04	$555	234	$31	0.05
HPS 100w, 120v	28	13,776	$1,674	3.08	LED 60w	6,586	$800	1.47	$17,808	7,190	$874	1.61
HPS 150w, 120v	10	7,200	$875	1.61	LED 99w	3,996	$486	0.89	$7,660	3,204	$389	0.72
HPS 150w, 240v	2	1,656	$201	0.37	LED 99w	799	$97	0.18	$1,532	857	$104	0.19
HPS 200w, 120v	57	54,720	$6,650	12.23	LED 117w	27,428	$3,333	6.13	$45,657	27,292	$3,317	6.10
HPS 200w, 240v	4	4,800	$473	1.07	LED 117w	1,925	$234	0.43	$3,204	2,875	$239	0.64
HPS 250w, 120v	2	2,400	$292	0.54	LED 179w	1,454	$177	0.33	$2,260	946	$115	0.21
HPS 250w, 240v	2	2,400	$292	0.54	LED 179w	1,454	$177	0.33	$2,260	946	$115	0.21
HPS 400w, 120v	1	1,848	$225	0.41	LED 179w	727	$88	0.16	$1,130	1,121	$136	0.25
Inc 92w	1	372	$45	0.08	LED 65w	257	$31	0.06	$750	115	$14	0.03
MH 70w	17	6,120	$744	1.37	LED 64w	4,366	$531	0.98	$12,750	1,754	$213	0.39
MH 175w	16	13,824	$1,680	3.09	LED 140w	9,024	$1,097	2.02	$16,000	4,800	$583	1.07
TOTAL	654	288,048	$34,893	69.87		146,432	$16,944	32.74	$301,931	141,616	$17,949	31.66

Data Source Notes and Assumptions: Potential replacement lamps and estimated installation costs provided by Republic ITS for illustrative purposes only; actual replacement lamps will require further analysis. Costs assume that all fixtures are 120 volts and all fixtures are cobra heads, since material pricing and wattages vary based on the style of fixture. Operating costs derived from the PG&E LS-2 rate schedule, effective 3/1/11.

Measure 3.4.G6: Upgrade Traffic Signals to Energy-Efficient Technologies: LED Retrofit

Signal Type	Quantity	Existing Lamp (watts)	Annual Energy Use (kWh)	Annual Energy Cost	GHG Emissions (metric tons)	Proposed Replacement LED Lamp (watts)	Annual Energy Use (kWh)	Annual Energy Cost	GHG Emissions (metric tons)	Reduction in Annual Energy Use (kWh)	Annual Energy Cost Savings	Reduction in GHG Emissions (metric tons)
8" Yellow Balls	50	69	630	$85	0.14	7.7	70	$9	0.02	559	$75	0.13
12" Yellow Balls	14	135	345	$46	0.08	12	31	$4	0.01	314	$42	0.07
12" Yellow Arrows	3	135	74	$10	0.02	9	5	$1	0.00	69	$9	0.02
16" Pedestrian Signals	19	69	239	$32	0.05	11	38	$5	0.01	201	$27	0.04
TOTAL			1,288	$173	0.29		144	$19	0.03	1,144	$154	0.26

Data Source Notes and Assumptions: Existing and proposed lamp types, wattages, energy usage and estimated installation costs provided by Republic ITS in a traffic signal audit completed in April 2009. Assumes yellow balls and arrows and pedestrian signals are on 0.5 hour per day. Annual energy costs based upon PG&E's TC-1 Schedule for traffic control service, effective March 1, 2011.

Measure 3.4.G7: Purchase Marin Clean Energy Deep Green Electricity for Government Facilities

Projected electricity use in 2020	720,726 kWh
Electricity use reduced by other measures	314,047 kWh
Electricity use added back for electric vehicles	5,279 kWh
Deep Green electricity purchase	411,957 kWh
Annual Deep Green electricity cost	$4,120
GHG emissions reduction	92.1 metric tons

Data Source Notes and Assumptions: Assumes 2010 deep green electricity cost of $0.01 per kWh.

3.5 Green Purchasing

Measure 3.5.G1: Upgrade to Energy Star-Rated Office Equipment

Equipment	Quantity	Estimated Annual Energy Saving Per Unit (kWh)	Annual Energy Savings (kWh)	Annual Energy Cost Savings	Reduction in GHG Emissions (metric tons)
Monitor	25	18	450	$77	0.10
Computer CPU	18	49	882	$151	0.20
Imaging Equipment	10	12	120	$20	0.03
TOTAL	53		1,452	$248	0.32

Data Source Notes and Assumptions: Estimated energy savings based upon energy savings calculators developed by the U.S. Environmental Protection Agency and U.S. Department of Energy and available at www.energystar.gov. For estimating purposes, computers and monitors were assumed to have sleep settings activated and to be turned off at night. Annual electricity cost savings are based on an average of summer and winter rates of .17082 per kWh from PG&E's A-1 Electric Rate Schedule, effective January 1, 2011.

Measure 3.5.G2: Switch to 30% Recycled Paper

Paper purchased per year	744 reams
Paper weight	3,720 pounds
Paper cost @ $36 per case	$2,678
30% recycled paper cost @ $43 per case	$3,199
Additional cost	$521
GHG emissions reduction	1,373 pounds
GHG emissions reduction	0.6 metric tons

Data Source Notes and Assumptions: GHG emissions reduction estimates were made using the Environmental Defense Fund Paper Calculator at www.edf.org/papercalculator/.

3.6 Waste Reduction, Recycling and Zero Waste

Community Goal 3.5.C1: Divert All Food Waste from Landfill

Projected waste in 2020	12,356 tons
Projected food waste in 2020	1,468 tons
GHG emissions reduced	395 metric tons

Data Source Notes and Assumptions:Estimated food waste based on the CIWMB 2004 Statewide Waste Characterization Study. This state average waste characterization accounts for residential, commercial and self-haul waste. http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097

CACP	CIWMB	% of Total	Methane Emissions (metric tons / short ton of waste)
Paper Products	All paper types	21	1.940
Food Waste	Food	14.6	1.098
Plant Debris	Leaves and Grass, Prunings and Trimmings, Branches and Stumps, Agricultural Crop Residues, and Manures	6.9	0.622
Wood/Textiles	Textiles, Remainder/Composite Organics, Lumber, and Bulky Items	19.8	0.549
All Other Waste	The other category includes all inorganic material types reported: Glass, Metal, Electronics, Plastics, Non-organic C&D, and Special/ Hazardous Waste.	37.7	0.000

The 75% methane recovery factor is derived from the Local Government Operations Protocol, Chapter 9. The methane emission factors used in ICLEI's CACP Software were derived from the EPA WARM model. For quantification of emissions, only methane generation (or gross San Anselmo emissions) is taken into account. These emissions are estimated to take place over an extensive (up to 100 year) cycle, as anaerobically degradable organic carbon decomposes in a landfill. More information on the WARM Model is available at: http://epa.gov/climatechange/wycd/waste/calculators/Warm_home.html

Measure 3.6.C2: Reduce All Other Solid Waste Disposal to Landfills by 25%

Projected waste in 2020	12,356 tons
Food waste diverted	1,468 tons
Remaining landfilled waste in 2020	10,888 tons
GHG emissions from remaining waste	1,773 metric tons
25% reduction in remaining waste	443 metric tons

Measure 3.6.G1: Reduce Solid Waste Disposal to Landfill by 25%

Projected waste in 2020	165.8 tons
GHG emissions from waste in 2020	42.0 metric tons
25% reduction in GHG emissions	10.5 metric tons

Data Source Notes and Assumptions: Waste Characterization based on California Integrated Waste Management Board (CIWMB), derived specifically for the "Public Administration" sector, using the Business Waste Characterization portion of the CIWMB 1999 Statewide Waste Characterization Study: http://www.ciwmb.ca.gov/WasteChar/BizGrpCp.asp

CACP	CIWMB	Percent of Total
Paper Products	All paper types	39.4
Food Waste	Food	9.8
Plant Debris	Leaves and Grass, Prunings and Trimmings, Branches and Stumps, Remainder/Composite Organic	17
Wood/Textiles	Textiles (Under "Other Organic"), Lumber (Under "Construction and Demolition"), Remainder/Composite Construction and Demolition	6.7
All Other Waste	The other category includes all inorganic material types reported: Glass, Metal, Electronics, Plastics, Non-organic C&D, and Special/Hazardous Waste.	27.1

3.7 Water and Wastewater

Measure 3.7.C1: Reduce Water Use in Community by 15%

Per capita water use per day, FY 05/06	139 gallons
Water use in 2005	634,187,500 gallons
Projected water use in 2020	634,187,500 gallons
Indoor, hot water use	127,471,688 gallons
15% reduction in hot water use	19,120,753 gallons
Reduction in natural gas use	108,682 therms
Reduction in electricity use	1,525,836 kWh
Estimated reduction in GHG emissions	922 metric tons

Data Source Notes and Assumptions: Per capita water use in Marin Municipal Water District FY 2005/2006 was 139 gallons per day, MMWD Report on Water Production and Related Statistics, June 30, 2008, p.12. Indoor water use assumed to be 67% of total water use (Dan Carney, MMWD) and hot water use 30% of indoor water use (EBMUD Indoor Water Conservation Study (p. 31), 2003; see http://www.ebmud.com/about_ebmud/publications/technical_reports/residential_indoor_wc_study.pdf). Analysis assumes 0.0098 therms to heat one gallon of water, 0.19 kWh to heat one gallon of water, and 58% of hot water heaters use natural gas (ICLEI CAPPA Beta).

3.8 State Actions

Measure 3.8.C1: PG&E Achieves 33% Renewable Portfolio Standard by 2020

Projected community electricity use in 2020	50,648,673 kWh
Less direct access electricity	2,446,231 kWh
Electricity use reduced from other measures	41,160,788 kWh
Electricity use added back for electric vehicles	376,171 kWh
Remaining electricity usage	7,417,826 kWh
GHG emissions with 2005 PG&E emission factor	1,658 metric tons
GHG emissions with projected 2020 PG&E emissions factor	867 metric tons
Estimated reduction in GHG emissions	791 metric tons

Data Source Notes and Assumptions: Projected 2020 PG&E CO_2e emission factor of 0.25763 is based on PG&E's 2005 electric power mix as follows: 12% from renewable sources; 20% from large hydro; 24% from nuclear; 42% from natural gas; 1% from coal; and 1% from other GHG-emitting sources. Analysis assumes additional 21% renewable energy will displace GHG-emitting sources in the electric power mix. Many variables will affect the actual 2020 emission factor, including the availability of large hydro and nuclear electricity sources, and the GHG reduction potential calculated here assumes conditions will be similar to 2005.

Measure 3.8.C2: AB 1493 Pavley Standards

2020 CA transportation emissions	225.4 $MMTCO_2e$
Expected reduction in emissions under phase one	16.4 $MMTCO_2e$
% reduction	7.28%
Community transportation emissions, projected 2020	40,777 metric tons
GHG emissions reduced by other measures	2,125 metric tons
Remaining GHG emissions	38,652 metric tons
Estimated reduction in GHG emissions	2,812 metric tons

Data Source Notes and Assumptions: California Air Resources Board, "Climate Change Scoping Plan: A Framework for Change," December 2008, p. 13. California Air Resources Board, "Comparison of Greenhouse Gas Reductions for the United States and Canada under U.S. CAFE standards and California Air Resources Board Greenhouse Gas Regulations," Feb. 25, 2008, p. 13, http://www.energy.ca.gov/2008publications/ARB-1000-2008-012/ARB-1000-2008-012.PDF.

Measure 3.8.C3: Low Carbon Fuel Standard

2020 CA transportation emissions	225.4 $MMTCO_2e$
Expected reduction in emissions	15 $MMTCO_2e$
% reduction	6.65%
Community transportation GHG emissions, projected 2020	40,777 metric tons
GHG emissions reduced by other measures	2,125 metric tons
Remaining GHG emissions	38,652 metric tons
Estimated GHG emissions reduction	2,572 metric tons

Data Source Notes and Assumptions: California Air Resources Board, "Climate Change Scoping Plan: A Framework for Change," December 2008, pp. 13 and 17.

Measure 3.8.G2: AB 1493 Pavley Standards

California transportation emissions, year 2020	225.4 $MMTCO_2e$
Expected reduction in emissions under phase one	16.4 $MMTCO_2e$
% reduction	7.28%
Local government transportation emissions, year 2020	342.0 metric tons
GHG emissions reduced by other measures	55.5 metric tons
Remaining GHG emissions	286.5 metric tons
Estimated reduction in GHG emissions	20.8 metric tons

Measure 3.8.G3: Low Carbon Fuel Standard

California transportation emissions, year 2020	225.4 $MMTCO_2e$
Expected reduction in emissions	15 $MMTCO_2e$
% reduction	6.65%
Local government transportation emissions, year 2020	342.0 metric tons
GHG emissions reduced by other measures	55.5 metric tons
Remaining GHG emissions	286.5 metric tons
Estimated reduction in GHG emissions	19.1 metric tons

APPENDIX B

Summary of Recommended Actions

Recommended Community Actions

Measure		GHG Reductions (Metric Tons)	% Below 2005 Levels
3.2.C1	Increase Trees and Vegetations for a Net Gain of 50 Trees	2	-
3.2.C2	Offset Emissions from Residential Natural Gas Use	812	1.2%
3.3.C1	Encourage Transit-oriented Development and Workforce Housing	23	0.03%
3.3.C2	Increase Walking and Biking for Local Trips	524	0.8%
3.3.C3	Increase Public Transit Use	535	0.8%
3.3.C4	Increase Ridesharing	311	0.4%
3.3.C5	Accelerate Adoption of Electric Vehicles	731	1.0%
3.4.C1	Improve Energy Efficiency in 20% of Existing Residential Buildings	954	1.4%
3.4.C2	Improve Energy Efficiency in 20% of Existing Commercial Buildings	296	0.4%
3.4.C3	Reduce Energy Use in New and Substantially Remodeled Residential Buildings	116	0.2%
3.4.C4	Reduce Energy Use in New Commercial Buildings	13	0.02%
3.4.C5	Install Solar Energy Systems in 20% of Existing Residential Buildings	1,294	1.9%
3.4.C6	Install Solar Energy Systems in 15% of Existing Commercial Buildings	560	0.8%
3.4.C7	10% of Ratepayers Purchase Marin Clean Energy Deep Green Electricity	829	1.2%
3.4.C8	70% of Ratepayers Purchase Marin Clean Energy Light Green Electricity	5,224	7.5%
3.6.C1	Divert All Food Waste from Landfill	395	0.6%
3.6.C2	Reduce All Other Solid Waste Disposal to Landfills by 25%	443	0.6%
3.7.C1	Reduce Hot Water Use in Community by 15%	922	1.3%

Recommended Government Operations Actions

Measure		Cost to Implement	Annual savings	GHG Reductions (Metric Tons)	% Below 2005 Levels
3.2.G1	Increase Public Trees and Vegetation for a Net Gain of 50 Trees	$10,000	n/a	1.9	0.3%
3.2.G2	Offset Emissions from Natural Gas Use	$687 per year	n/a	62.0	9.8%
3.2.G3	Offset Emissions from Town Vehicles	$1,457 per year	n/a	111.0	17.5%
3.3.G1	Replace Town Vehicles with Electric Vehicles	As replaced	$3,445	9.9	1.6%
3.3.G2	Encourage Town Employees to Commute by Alternative Means of Transportation	Variable	n/a	19.5	3.1%
3.3.G3	Replace Police Vehicles with More Fuel-Efficient Vehicles	As replaced	$10,345	26.0	4.1%
3.4.G1	Install Energy Efficiency Upgrades in Town Buildings	$103,405	$6,219	30.9	4.9%
3.4.G2	Install Solar Energy System for Town Hall	$102,000	$3,170	4.2	0.7%
3.4.G3	Install Solar Energy System for Corporation Yard	$37,000	$1,153	1.5	0.2%
3.4.G4	Install Solar Energy System for Isabel Cook Community Center	$601,000	$18,731	24.5	3.9%
3.4.G5	Upgrade Street Lighting to Energy-efficient Technologies (LED)	$301,931	$17,949	31.7	5.0%
3.4.G6	Upgrade Traffic Signals to Energy-efficient Technologies (LED)	As replaced	$154	0.3	-
3.4.G7	Purchase Marin Clean Energy Deep Green Electricity for Government Facilities	$4,120 per year	n/a	92.1	14.5%
3.5.G1	Upgrade to Energy Star-Rated Office Equipment	As replaced	$248	0.3	-
3.5.G2	Purchase 30% Recycled Paper	$77	n/a	0.6	0.1%
3.6.G1	Reduce Solid Waste Disposal to Landfill by 25%	n/a	n/a	10.5	1.7%